

INFO WORLD

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NEWS REPORT

Security elite swat at viruses

By Matthew Nelson

A MALICIOUS NETWORK of viruses increasingly resembling terrorist attacks, the security industry is developing its own version of SWAT teams that aim to swiftly diffuse crises and get hostages out of a jam.

Recently, security vendor Network Associates Inc. (NAI) was faced with a difficult virus to eradicate when its customer MCI

Also, see interview
with RSA's CEO
Jim Bidzos,
page 39.



See page 39

Tuning up Notes

Lotus pulls out stops to stay competitive

By Ted Smalley Bowen

BUFFETED BY THE winds of technological and market change, Lotus Development this week at its Lotusphere user conference in Orlando, Fla., will respond with a flurry of product and partnership announcements designed to help

keep its Notes and Domino platform a major factor in business computing environments.

In addition to finally launching Release 5 (R5) of Notes/Domino, the company this week with its partners will tout Lotus's knowledge

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Operating instructions: Win2000 on the server? Linux on the desktop? Read these first. 59, 62
Recycling data: Novera's jBusiness ups the ante for maximized Web app deployment. 47

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Waiting for Windows 2000

Possible interim NT release this year may offset concerns

By Bob Trutt

THE OLD CLICHÉ "What's in a name?" is resonating at Microsoft, where the new moniker Windows 2000 really means the year 2000. Several sources confirmed that the software giant is now aiming to release the chronically late server/desktop operating system in February 2000.

The company may look to fill the gap, however, with an interim release — possibly called Windows NT 4.5 or even NT 5.0, Windows 2000's previous name — which would include all of its ostensibly stable features.

According to sources who requested anonymity, many ISVs and large corporate customers are

pushing Microsoft to go the point-release route. If there is an interim release later this year, the ship date for Windows 2000 — which one source said Microsoft now has pegged for Feb. 25, 2000 — will be pushed back even further.

"This product is horribly late, no matter how you look at it," said

WINDOWS page 25

Telecom

MCI places network in users' hands

By Laura Kujubu

CORPORATE telecommunications customers can look forward to taking control of their voice and data services, as MCI WorldCom later this month will launch MCI WorldCom Interact, a suite of self-service applications for managing telecommunications functions.

By using MCI WorldCom Interact, which is available now and will be announced at ComNet in Washington on Jan. 26, businesses will have Web-based tools that enable control of day-to-day telecommunications network operations, including active network management, service analysis, service ordering, and payment processing. Currently, business customers must notify MCI WorldCom support staff to handle such requests.

For example, customers can use Interact to dynamically change network configurations and allocate bandwidth as needed, according to Ron McMurtrie, vice president of

MCI WORLD.COM page 25



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- Managing change: Involving staff members will ease the transition process, page 75.

FROM THE EDITOR IN CHIEF

- Sandy Reed says business professionals will need technology skills to work with IT, page 53.

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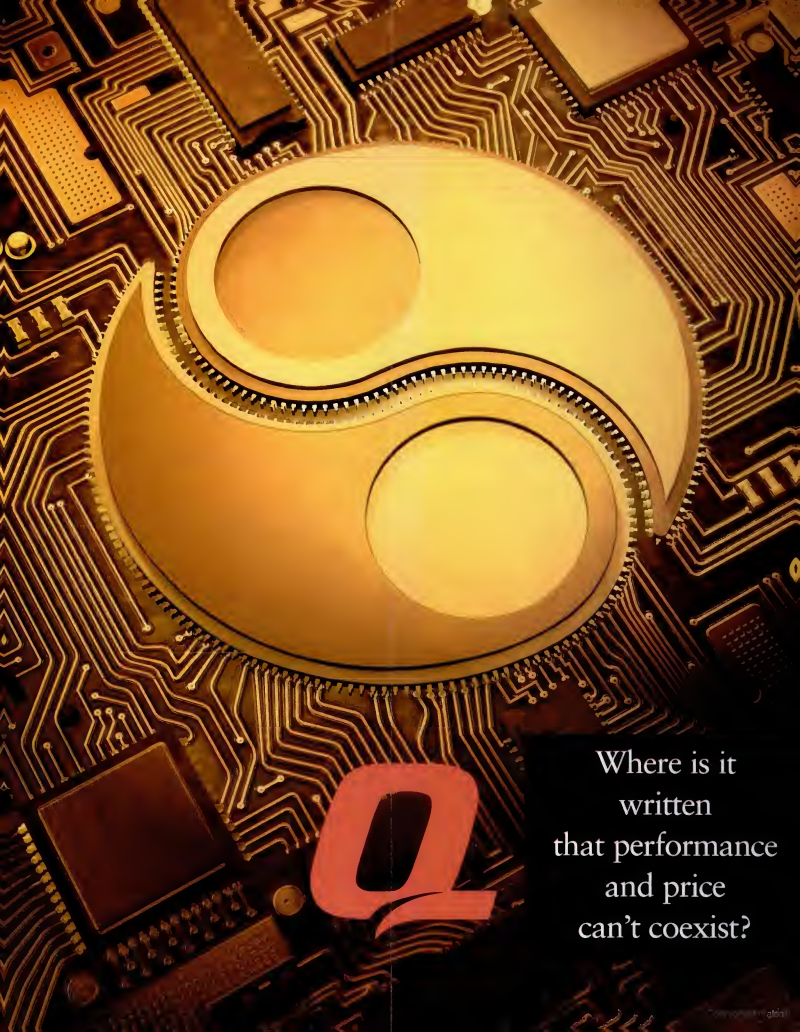
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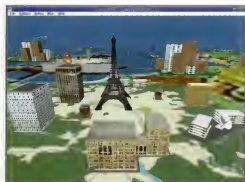
Unicenter TNG is the most open, interoperable and scalable management solution available. It has been supported by virtually every major hardware and software company, including Microsoft, Sun, SAP, Intel, HP, DIGITAL, Tandem, NCR, SGI, and Data General. Peter Kastner from the Aberdeen Group recently summed it up when he said, "Aberdeen positions the Framework as the enterprise management entry-level user choice and *de facto* ISV platform choice."

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Cisco expanding its VPN mission

■ MPLS will be lynchpin of new guaranteed service plan

By David Pendery
and Stephen Lawson

CISCO THIS WEEK will move to give enterprises a view into virtual private network (VPN) performance as part of a major initiative to help service providers create guaranteed WAN services tuned for particular customers.

The company will outline plans to use the emerging Multiprotocol Label Switching (MPLS) standard to let service providers guarantee the performance of VPNs across multiple carrier networks, according to sources familiar with the company's plans. Other sources confirmed that MPLS will be approved by the Internet Engineering Task Force (IETF) within months, and that Cisco has positioned itself

to capitalize on the new technology and its use in public and private networks.

One of Cisco's first steps will be to leverage its Internet Performance Monitor (IPM) product to help customers ensure that outsourced network service promises are met. Cisco this week is releasing IPM, Version 2 (IPM2), which measures "hop-to-hop" performance across IP addresses on LANs and WANs.

The IPM2 software accesses the Response Time Reporter agent in Cisco routers, and uses the technology to measure response time and availability between any network devices with IP addresses. IPM2 evaluates designated thresholds and generates alarms, issuing an SNMP trap to any event-pro-

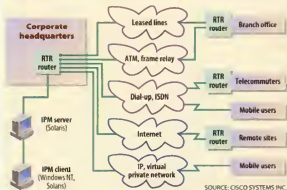
cessing engine, a source familiar with Cisco's development said. Graphical performance data can be viewed on Solaris or Windows NT workstations via Cisco's new Java-based user interface. IT professionals will thus be able to monitor routers and other IP devices, and either maintain the service levels in their own networks, or notify service providers of problems and bottlenecks.

Rob Callahan, senior engineer at SSDS Inc., a systems integration company in Denver, has implemented the product in SSDS' network development for the Wake County Schools District, in Raleigh, N.C.

"We have 120 sites we centrally manage. The next step was how to

Version 2 of Cisco's Internetwork Performance Monitor enables IP and VPN monitoring

The combination of Response Time Reporter (RTR) and IPM will check hop-to-hop IP performance.



SOURCE: CISCO SYSTEMS INC.

start looking at performance," Callahan said. "With the software, we can ask 'Which links do we need to concentrate on, as far as upgrades?'"

IPM2 will ship for Solaris servers and for Solaris and NT clients in

March. Cisco will release HP-UX, IBM AIX, and Windows NT versions by the end of 1999. Pricing will range from \$10,000 to \$20,000.

Cisco Systems Inc., in San Jose, Calif., is at www.cisco.com.

Netscape, others roll out security wares at RSA show

By Matthew Nelson

THE SECURITY requirements of Internet commerce are making public key infrastructure (PKI) systems, digital certificates, and directories the hot topics at the RSA Data Security conference this week in San Jose, Calif.

Over the course of this year, digital certificates and the PKI systems that help manage them will be more widely adopted for securing messages and commercial transactions, according to analysts.

"People want the ability to extend their internal network outward for things like VPNs [virtual private networks] and extranets, and public key infrastructure networks provide the foundation for authentication and security as things travel over the Internet," said Jonathan Penn, an analyst at Ferris Research, in San Francisco. "[And] there's definitely a large focus on electronic commerce. People see that as the big money maker."

Addressing the need for directory and certificate management in i-commerce, Netscape this week is

announcing the Netscape Directory for Secure E-Commerce 4.0, as well as Netscape Directory Server 4.0, Delegated Administrator 4.0, Certificate Management System 4.0, and Netscape Meta-Directory 1.0.

"It's an expansion of our directories product line, using the directories as a foundation for security," said Karen Horwitz, senior product manager at Netscape.

The Netscape Directory Server 4.0 supports millions of user entries on a single system, and the Certificate Management System provides PKI validation and other features such as optional key recovery. The Netscape Directory for Secure E-Commerce combines both systems with the Delegated Administrator to provide secure authentication of transactions. With the addition of the Netscape Meta-Directory, users can integrate extranet applications with legacy directories.

Also at the show, GTE CyberTrust will announce the CyberTrust Accelerator Program, which is a combination of products and services to facilitate adoption of digi-

PKI products

The following companies are making public key infrastructure (PKI) product announcements at the RSA Data Security Conference this week.

Company	Product
Check Point	VPN-1 Certificate Manager
VeriSign	Global Affiliate services
LockStar	LockStar PKI-to-Legacy systems
Spyrus	Spyrus SCA
emCommerce	getAccess Open PKI

tal certificates and PKI. The program's cost starts at \$150,000.

Another company looking to ride the i-commerce wave is Xcert. Its Sentry 3.5 suite includes a Certificate Authority (CA), a Registration Authority (RA), a PKI system, and the Xcert Developer Kit (XDK), all of which are designed for an open-directory architecture, according to the company.

"Our product is engineered with the Internet in mind from the ground up," said Patrick Richard, chief technology officer at Xcert.

The Xcert Sentry 3.5 suite is available now for Windows NT and Unix, with pricing for the CA starting at \$30 per user, \$5,000 for the RA, and \$1,000 for the XDK.

Netscape Communications Corp., in Mountain View, Calif., is at www.netscape.com. GTE CyberTrust, in Needham Heights, Mass., is at www.gte.com. Xcert International Inc., in Walnut Creek, Calif., is at www.xcert.com.

Electricity industry says everything's OK for Y2K

By Rob Garrettson and Jessica Davis

WHAT GOOD would it do to fix corporate year-2000 problems if there will be no power to run the systems?

The North American electric industry last week sought to reassure the public on that issue, saying it is confident that it will solve year-2000 problems with little or no disruption to electricity supplies, according to the latest industry self-assessment.

Although they acknowledged there is much more to be done, and that some companies will not meet the industry's recommended deadlines, the industry cited significant progress on year-2000 preparations since the industry's first report to the Energy Department last September. (See "The big blackout" at www.infoworld.com/printlinks.) They predicted any date-related computer glitches would be minor.

Analysts welcomed the news, but as with anything related to year 2000, they questioned what would really happen when 2000 comes.

"They are stating it as best they know it at this point," said Karl Jensen, director of the retail energy practice at the Yankee Group, in Boston. "No one really knows what will happen."

However, many analysts believe mission-critical failures, or failures in delivering power to customers, will be few or nonexistent. Noncritical systems, such as building security or customer billing, are more

likely to be affected by the year-2000 bug, analysts said, and the chances of a national blackout are remote.

The North American Electric Reliability Council, a private industry group charged with coordinating the industry's year-2000 readiness effort, identified some remaining critical issues.

■ Reliance on third-party voice and data communication and its limited ability to test its external communication systems. Real-time operations and control of electric systems is dependent on telecommunications service providers. The electric industry has been working with this industry on joint year-2000 rollover tests this year.

■ Interdependence of the components in the electric power grid requiring virtually all of more than 3,000 entities that generate, transmit, and distribute electric power to meet the year-2000 targets to ensure uninterrupted service.

■ The radial design of electric distribution systems that provide few options for correction in real time in the event of a failure. However, these are the "least digital" components and the least susceptible to year-2000 anomalies.

The North American Electric Reliability Council can be reached at www.nerc.com.

Rob Garrettson is editor in chief of the IDC News Service, an InfoWorld affiliate.

For the record

In "Ways to resolve ethical conflicts" (Dec. 28/Jan. 4, page 73) we printed an incorrect e-mail address for a mailing list dealing with computer ethics. To subscribe to the list, send an e-mail message to mailbase@mailbase.ac.uk with the following two lines of text in the body of the message: join computer-ethics first_name(s) last_name on the first line; and the word stop on the second line. In "Building Harmony" (Jan. 11, page 1), we referred to Computer Associates' Jasmine as an object-relational database. It actually is an object database.

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SPECIAL COVERAGE: LOTUSPHERE '99

Notes/Domino readied for the long haul

■ But observers question the platform's long-term viability

By Ted Snally Bowen, Dana Gardner, and Ed Scannell
 LOTUS DEVELOPMENT is entering 1999 with a firm grip on a product category that some observers think could be going the way of the office typing pool. The challenge facing this IBM software subsidiary is to match the pace of technical change in enterprise software without abandoning its core constituents.

Observers agree that the Notes/Domino Release 5 upgrade, to be featured at this week's annual Lotusphere users conference in Orlando, Fla., represents a big step forward in terms of performance, collaborative computing features, and use of open standards. However, the jury is still out on whether the many

advances bolstering the Domino server platform and Notes client can keep the underlying architectures viable in the long run.

Lotus faces these issues from a positive vantage point: The company maintained its lead in the groupware market throughout 1998, in the face of stiff competition from Microsoft (see chart, right). Still, the challenge remains for Lotus to prove the necessity of a relatively expensive — and some argue too feature-rich — platform, when cheap, standards-based applications for messaging, workflow, and collaborative computing abound, some analysts say.

Another potential thorn in Lotus' side is timing. Release 5 (R5), having slipped roughly one year from

its first delivery expectations, may have disappointing sales, because many corporate IT shops are close to barring their doors to any real infrastructure changes in the count-down to the year 2000.

Nonetheless, the broadening of the Domino server to tap into and integrate with many more types of information — including enterprise resource planning systems — has earned praise.

"Domino is getting better connected all the time. It's not fair to say it's painted into a corner anymore," said Steve Dickson, groupware architect at US West Communications, in Denver, which has 20,000 Notes seats.

The latest release of Domino also lets users use non-Notes clients if they wish.

"That's a big benefit. Our users can be at home or on the road and use other clients, and that's good," said Craig Lowenthal, vice president of IT at Reliance National Insurance, in New York, a large Notes customer.

On the client side, Notes R5 takes on a Web browser metaphor, departing from the existing Notes client design. This new interface makes sense, in light of the product's support for Web standards

Lotus' Release 5: The Domino effect

Lotus counts down to the all-delayed release of the Notes/Domino Release 5 upgrade.

Rollout predictions

March/April	Volume shipment expected
June/July	First point upgrade and early deployment expected
Second half of 1999	Modest first wave of migration to Release 5 expected
Spring 2000	Earliest expected widespread adoption of Release 5

SOURCE: GARTNER GROUP

... but despite these predictions, Notes trails Microsoft's Exchange in growth.



Both products are expected to have ended 1998 at about 13 million new seats each. As of October 1998, Notes' total installed base reached 32 million seats, while Exchange's installed base hit 23 million.

SOURCE: ELECTRONIC MAIL & MESSAGING SYSTEMS

and its new role as a potential hub for desktop productivity, Web access, and communications. But it also strikes some as a training and upgrade headache, and others as an unappealing hybrid.

Describing the new client last year, Lotus CEO Jeff Papows suggested, "think of the Notes 5 client as a central aggregation point for all kinds of Web applications and messaging and Web-based services."

Not persuaded, Jeffrey Tarter, editor of the *SoftLayer* industry newsletter in Watertown, Mass., opined, "In other words — it is a slop ball."

But as part of Lotus' continued march into the Web standards domain, many analysts and users hailed Notes R5's innovative use of the Secure MIME HTML standard,

and for making it possible to attach all manner of Web information to Notes e-mail.

Still, some believe that despite the Web standards makeover, Notes always was, and always will be, proprietary Lotus technology.

"Well, if [Papows] is talking standards then what does he do about Lotus itself being a rogue standard in the industry?" Tarter said.

Lotus Development Corp., in Cambridge, Mass., can be reached at www.lotus.com.

Ted Snally Bowen is the Boston bureau chief covering IBM and Lotus. Dana Gardner is an editor at large covering application development. Ed Scannell is an editor at large covering Microsoft and IBM.

NOTES VS. EXCHANGE: WE'VE ONLY JUST BEGUN

The battle raging between Lotus and Microsoft to attract users to their messaging platforms is proving to be only the precursor for the next war: Competing for customer loyalty from those migrating from the proprietary messaging systems to the larger arena of application servers, databases, and operating systems.

Microsoft likes to portray Lotus' latest upgrade, Notes 5.0, as playing catch-up to its own Outlook and Exchange 5.5 software. Lotus, meanwhile, is portraying Exchange and Outlook as lagging in the areas of multimedia and application development. But the future will hinge on how both companies transition those users — and all the data and applications associated with them — from Exchange and Notes/Domino to next-generation system architectures.

"When Lotus switched to Domino and brought in the Web, they were ahead. But that doesn't provide the road map that enterprises are looking for [when] integrating with data and applications and ERPs [enterprise resource planning applications]," said Doug Stumberger, Microsoft Exchange product manager, in Redmond, Wash. For Microsoft, that transition is firmly wrapped around the arrival of Windows 2000, Active Directory, Outlook 2000, and the next release of Exchange Server, code-named Platinum — all due late this year, except Outlook 2000, which is due in June.

Microsoft officials said that the cur-

rent Exchange state, the foundation of the system, will seamlessly transition to the company's SQL Server database in BackOffice, using Active Directory and the Extensible Markup Language to pave the way. Under the plan, Exchange and SQL Server form the data store, developers write to SQL Server using Microsoft tools, and Microsoft Transaction Server acts as the gateway from that store to various clients.

Microsoft's goal from migrating Exchange into Windows 2000/BackOffice, and hence the Microsoft Distributed Network Architecture (DNA), could put Lotus at a disadvantage if there's no similarly clear strategy of transitioning from Domino to an n-tier application server-based platform, analysts said.

"Microsoft is going to transition away from proprietary messaging to overall DNA, and I think Lotus will follow suit in some way. They have to do it if Notes will survive," said J.P. Morgenthal, president of NCFocus, in Hewlett, N.Y.

Some Notes users, however, are not swayed by Microsoft's vision of the future.

"If you look at the past, if you went with Microsoft you had to switch over systems. I still hear of problems with Exchange," said Craig Lowenthal, vice president of IT at Reliance National Insurance, in New York. "If Microsoft thinks people are going to switch to Windows 2000 anytime soon, they are mistaken."

— Dana Gardner

Lotusphere

Continued from page 1

management strategy along with extensions and enterprise integration hooks for the core platform. Lotus will also highlight enterprise resource planning (ERP) integration and its Suite for presentation of Domino content.

The beta version of Notes/Domino R5 has been well received.

"One of our major reasons for looking at R5 was that we can keep all this stuff on the back end going," said Victor Ramensky, director of IT at Allied Domec, a wine distributor in Heidelberg, Calif. "Also, for us, R5 was an all-inclusive toolkit. The Domino Designer was pretty easy to use for Web development, so [we] can now distribute production of what goes on the Web site among of our staff."

At the Lotusphere show, Lotus and IBM are expected to announce the bundling of WebSphere Standard Edition with Domino R5, and

Third-party parade

Some of Lotus' partners that plan to announce Notes Release 5-related software include the following companies and their products.

Company	Product	Description
GWI Software	GWI Collaborative Front Office suite	Help desk, sales, marketing, and asset management
Ives Development	TeamStudio Librarian	Repository
CompuWare	EcoSystems	Application service-level management suite
Cash Technology	Real-Action	Data integration software highlighting SAP R/3 links
Rethink	OpenQuota 5.0	Sales force and customer-relationship software
Lawson	Lawson Insight Connector, Desktop, and Designer	Integrates between Lawson's ERP applications and Notes

to promote using Domino with Advanced and Enterprise versions of that software for back-end integration. Following that enterprise theme, Lotus and fellow IBM subsidiary Tivoli Systems will announce out-of-the-box Tivoli management support for Lotus Domino R5.

Lotus will also roll out the latest versions of the Same Time synchronous communications and LearningSpace distance learning. Other expected announcements include the clarification of how developers can write to both native Notes and

Java using the Domino Studio; highlights of Domino performance and scalability on the AS/400 platform; significant third-party relationships, possibly including a deal with America Online, according to sources; and a "limited-time" free license offer to use the new Notes client with any server. Domino pricing is expected to remain mostly unchanged, with some increases in clustered configurations.

Lotus Development Corp., in Cambridge, Mass., can be reached at www.lotus.com.



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3Com turns focus to NICs

■ Security, mobility are keys to new card offerings

By Stephen Lawson

AS OF THIS WEEK will outline plans to enhance its network interface cards (NICs), making a pair of announcements that return the company's focus to its largest business.

The networking vendor, facing formidable competitors including Cisco and an emboldened Lucent, plans to bolster its NICs with security hardware and mobile-system configuration software.

A coprocessor to be announced this week is designed to make it more feasible for users to secure their systems in a LAN. 3Com worked with chip manufacturer VLSI to design the chip, which can perform encryption and authentication without affecting the performance of a 10Mbps or 100Mbps NIC, according to 3Com. The chip will use the IP Security standard, and 3Com has worked with Microsoft to ensure compatibility with Windows 2000 clients.

Also this week, 3Com will introduce Mobile Configuration Manager, the first of a series of software features for mobile PC NICs. The tool will allow administrators to set up multiple dial-up and LAN configurations on a mobile PC so users can easily move

from one location to another. Consistent, standardized configurations can be pushed to the mobile systems through the NICs.

Analysts said the configuration software could make life easier for 3Com NIC users.

"It hides the need for you to work with the Dial-Up Networking system, which is one of the hardest parts of Windows to deal with," said Jack Gold, an analyst at the Meta Group, in Stamford, Conn.

3Com officials said last week that the IPsec coprocessor will be one of several security enhancements coming this year.

According to one analyst, such embedded capabilities may make security easier and less expensive.

"Security is becoming a greater issue, not necessarily because people are worried, but because people like it," said David Paul Doyle, an analyst at Dataquest, in San Jose, Calif.

NICs equipped with the IPsec coprocessor will ship in the first half of this year, officials said. Mobile Configuration Manager is available now free of charge. A later version with multivendor support will carry a fee.

3Com Corp., in Santa Clara, Calif., can be reached at www.3com.com.

Micro Focus brings Cobol to the Web

By Michael Vizard and Dana Gardner

MICRO FOCUS WILL BRING its large installed base of Cobol programmers into the age of the Internet this week with the release of Net Express 3.0, an update to its application development environment that facilitates linking Cobol applications to the Web.

Though Java gets most of the attention in Web development, the majority of business process applications are written in Cobol. And most customers would rather extend those applications to the Web than rewrite them in Java, said John Guertin, group director of product management at Micro Focus.

With that goal in mind, the next release of Net Express includes an Internet application wizard that helps Web-enable Cobol applications, a forms designer, Web server performance tuning options, enhanced Unix support, remote debugging tools, and better integration with both Component Object Model and CORBA environments.

"This is very important to the Cobol-installed base right now: to preserve the business logic and keep their trained staff productive. [Micro Focus] is not getting into the next-generation stuff right now, but they have tested this, and it's going to work," said Sally Cusack, an analyst at International Data



NET EXPRESS 3.0 will allow IT managers to extend Cobol applications to the Web.

Corp., in Framingham, Mass.

For many businesses, Guertin asserts that the need to gain an Internet-commerce presence that is tightly integrated with their existing operations is now the pre-eminent goal. Because of that issue, many sites will find it more convenient to extend their existing business applications to the Web, rather than trying to cope with integrating Java and Cobol environments.

In the future, however, Micro Focus plans to add more links between its Cobol tools and other Java environments.

Net Express 3.0 is available now, priced at \$3,650 per seat.

Micro Focus, in Mountain View, Calif., can be reached at www.microfocus.com.

BUSINESS BRIEFS

■ ACQUISITION

Compaq to purchase retailer Shopping.com

COMPAQ ANNOUNCED last week it will acquire Shopping.com, an online retailer that offers a selection of more than 2 million products through a variety of partners.

When the acquisition is complete, Compaq will again put to work the resources it obtained by acquiring Digital Equipment. Compaq will leverage its AltaVista Web search technology, which, when combined with Shopping.com's e-commerce capabilities, will be a notably more complete Internet presence, according to Compaq.

Compaq will take the consumer knowledge gained from monitoring online purchases from Shopping.com to enable AltaVista to better organize content and information for its use, company officials said. AltaVista is currently the ninth leading Internet destination, according to Relevant Knowledge, an Internet research company. Compaq is aiming at elevating it into the top three, company officials said.

A wholly owned subsidiary of Compaq will commence a tender offer to acquire the outstanding shares of Shopping.com for \$19 per share, representing an approximate purchase price of \$220 million. Shopping.com's board and management have already approved the acquisition. Shopping.com will retain its name as a division within Compaq.

The acquisition will be completed quickly, possibly in as few as 30 days, according to Compaq officials.

■ FINANCIALS

Apple beats estimates

APPLE COMPUTER LAST WEEK reported first-quarter earnings of \$152 million, citing strong iMac sales as one of the leading contributors to its fifth consecutive profitable quarter. The earnings equal 95 cents per share, on revenue of \$1.7 billion, company officials said.

For the first quarter of 1998, Apple reported earnings of \$47 million, or 33 cents per share, on revenue of \$1.57 billion, 8 percent less than reported in the same quarter this year.

The first quarter of fiscal year 1999 included a \$29 million after-tax gain from the sale of 2.9 million shares of ARM Holdings. Without this nonrecurring item, the company's net income would have been \$123 million, or 78 cents per share.

Apple sold \$19,000 iMac computers during the first quarter, driving overall unit growth to 49 percent year-over-year.

Ending inventory dropped to \$25 million, which represents two days of inventory. Unit growth year-over-year was three to four times more than the industry average, according to company officials.

International sales accounted for 47 percent of the quarter's revenues.

■ LICENSING AGREEMENT

Motorola, Citrix agree

MOTOROLA AND CITRIX SYSTEMS announced last week they signed a licensing

Financials

Intel hits record revenue numbers

SEASONALLY strong PC demand in the second half of 1998 helped lift Intel's fourth-quarter revenue to \$7.6 billion, a record for the company and a 17 percent increase from the \$6.5 billion revenue reported for the same quarter one year ago, Intel said last week.

Fourth-quarter earnings per share were \$1.19, handsomely beating the consensus estimate of \$1.07 per share from analysts polled by financial watchdog First Call, and up from 98 cents per share one year ago. Net income for the quarter was \$2.1 billion, up 18 percent from \$1.7 billion one year ago.

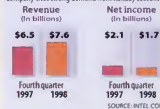
For the full year, which ended Dec. 27, revenues were \$26.3 billion, an increase of 5 percent on 1997 revenues of \$25.1 billion and another record for Intel, company officials said.

Sales reached record levels in the Americas, Europe, and Asia Pacific, Intel said in a statement.

Intel said it sold a record number of microprocessors, chip sets, and flash memory chips dur-

Intel reports record quarterly revenue

Company cites strong demand from holiday season.



ing the quarter.

Sales of motherboards, embedded processors, and microcontrollers also increased, company officials said. Exact unit figures were not immediately available.

MetaFrame server, enabling users secure access to corporate e-mail, files, and database information as if in the office.

The Citrix ICA client will be loaded into PCs, which will then connect with iDEN phones to access information remotely. In the future, Motorola will embed the Citrix software into iDEN handsets and other wireless devices, according to Motorola officials.

The remote-access solutions will be available in the first half of this year. Pricing information was not yet available.

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Vendors hone business decision-support tools

By Dylan Tweney and Stannie Holt
EXECUTIVES JUMPING on the bandwagon of such new management methodologies as activity-based management and one-to-one marketing are about to get some help from

the technology world.

In separate announcements, Oracle and E.piphany this week will introduce products aimed at providing data analysis for the next generation of decision support.

Meanwhile, PeopleSoft said it is partnering with four companies — Acta, Ardent, Infomatica, and Prism Solutions — to help import data into its decision-support product.

Oracle's Strategic Enterprise Management is a suite of four applications designed to help company executives make decisions based on strategic organizational goals.

Two of these applications are available this week: Balanced Scorecard, which helps to create performance measurements based on a company's strategic plan; and Activa, which facilitates activity-based management, whereby executives make decisions using enterprise-wide cost measurements. The other two applications will ship in early 2000, said Tony Kavanagh, marketing director at Oracle.

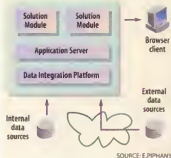
Enterprise resource planning (ERP) vendors have less experience in building analytic templates than specialist vendors, but they hope customers will prefer data marts built as an integrated part of their ERP suite, according to Henry Morris, program director at International Data Corp., in Framingham, Mass.

Roger Siboni, E.piphany's president and CEO, said e.piphany focuses on one-to-one marketing, which allows companies to identify their most profitable customers and deliver products individually tailored to those customers' needs.

According to Martha Rogers, a partner at the Peppers and Rogers Group, a one-to-one marketing consultancy in Bowling Green, Ohio, E.piphany's technology enables a customer-centric approach to marketing that is

Business analysis

E.piphany's e.piphany system collects data from a variety of sources — including legacy databases, enterprise resource planning systems, Internet-commerce servers, and third-party information providers — into a consolidated data mart. Analysis modules running on the E.piphany e.piphany Application Server then create customizable decision-support reports, which are delivered via Web browsers.



difficult to carry out with traditional data-mining tools.

"[E.piphany] gives me a sensible way of doing rules-based marketing, which makes it possible to personalize and automate my marketing strategy for individual customers," Rogers said.

E.piphany's suite of 16 applications, eight of which are currently available, provides customer-oriented analyses of data from Internet-commerce, sales-force automation, ERP, and legacy systems. A typical deployment costs \$300,000, Siboni said.

Oracle Corp., in Redwood Shores, Calif., is at www.oracle.com. E.piphany, in Palo Alto, Calif., can be reached at www.e.piphany.com. PeopleSoft, in Pleasanton, Calif., can be reached at www.peoplesoft.com.

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New DSL programs roll out in the U.S.

By Jeff Walsh and David Pendery

DIGITAL SUBSCRIBER LINE (DSL)-related services grew last week, as several major companies — including Pacific Bell and America Online — unveiled new programs.

Both Pacific Bell and its parent company, SBC Communications, announced plans last week to offer Asymmetric Digital Subscriber Line (ADSL) Internet and data-access services priced starting at \$39 per month.

The rollout will bring low-cost, high-bandwidth access to residents of California and SBC's Southwestern Bell customers in Texas, Missouri, Oklahoma, Arkansas, and Kansas.

Also last week, America Online and Bell Atlantic announced they would be working together to roll out DSL access to AOL subscribers this summer, and DigitalSelect said it is bringing DSL access to businesses in Washington D.C., Maryland, and Virginia.

Although ADSL offers a viable alternative to T1 lines for many businesses, the Baby Bell rollouts specifically target consumers and small businesses. One analyst said that is unlikely to change anytime soon.

"They're not stupid," said Larry Howard, vice president of Infonetix Research, in San Jose, Calif. "They're going to use ADSL to get revenue they're not getting now. If you're

in a spot where you can get a T1, they're not going to sell you a cheaper DSL service. They have control of whether that would happen."

Howard said businesses looking to deploy ADSL will have to go through the competitive local exchange carriers (CLECs).

"I think the CLECs offering DSL services to businesses are more likely to eat into the phone company's business than the company will eat into its own business," Howard said.

SBC is expecting demand for the services to grow, and notes that Dataquest predicted the number of ADSL subscribers will expand from the current 50,000 to 5 million worldwide by 2002.

The asynchronous nature of ADSL means that data can move downstream from a host or ISP, and upstream from a user location. Southwestern Bell and Pacific Bell customers will be able to experience downstream connections as fast as 1.5Mbps, and upstream connections of 128Kbps.

Pacific Bell, in San Francisco, is at www.pacbell.com. SBC Communications Inc., in San Antonio, is at www.sbc.com. America Online, in Dulles, Va., is at www.aol.com. Bell Atlantic Corp., in New York, is at www.bellatlantic.com. DigitalSelect Inc., in Sterling, Va., is at www.digitalselect.com.



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Here's an example of what you might find at this quarter's Microsoft TechNet briefing. For details on the TechNet briefing nearest you—and its agenda—please visit www.microsoft.com/technet/events/.

General Session:

Microsoft Strategy Update, Including Business Commerce

Get the latest information on Microsoft's technical strategy, including exciting new developments in the field of business commerce. You'll also get a look at a beta version of the Microsoft Windows® 2000 operating system and an overview of the latest enhancements to the TechNet program.

Infrastructure

- How to use the fixes and enhancements in Service Pack 4 for the Microsoft Windows NT®. Server 4.0 network operating system
- Addressing year 2000 compliance issues and Euro future updates
- Windows 2000 architectural overview and update

Business Application

- How to design and deploy business systems for corporate purchasing
- Deploying business systems for branch offices using Microsoft BackOffice®. Server 4.5
- How to provide publishing, collaboration, and data access using Office 2000 in your enterprise

Development (MSDN-)

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DOJ lays traps for Gates, concludes case

By Elizabeth Wasserman

THE U.S. DEPARTMENT OF Justice put Bill Gates back in the spotlight as it closed its antitrust case against Microsoft last week, releasing hundreds of potentially embarrassing e-mail messages and an hour of videotaped

excerpts from the deposition of Microsoft's chairman and CEO.

In the tape Gates was pressed on whether Microsoft officials ordered underlings to publicly rephrase the way they referred to products in order to help Microsoft's case.

"Are you aware of any discussions within Microsoft about changing the way terms are used in order to advance your interests in the litigation?" government attorney David Boies asked Gates. After Gates replied, "No," he was shown



an e-mail message addressed to him from another Microsoft official, dated Feb. 15, 1998, that stated: "Saying 'put the browser in the OS' is already a

statement that is prejudicial to us."

In other portions of the tape, Gates is questioned about whether he asked an employee to probe the business model of software rival Netscape.

"I don't think I did," Gates said. "I'm quite certain I wasn't the one who asked for the information."

Stephen Houck, an attorney for the 19 states that joined the Department of Justice's antitrust case, then confronted Gates with a December 1996 e-mail message from him that asked, "What kind of data do we have about how much software companies pay Netscape?"

Microsoft representatives characterized the government's last-minute evidence-drop as an attempt to "divert attention away from their weak case by turning this trial into a personal attack on Gates, who is one of the great visionaries of this century."

After the government wrapped up its case, U.S. District Judge Thomas Penfield Jackson rejected Microsoft's move to have the case dismissed. Then Microsoft called as its first witness an economist who described as irrelevant whether the company holds a monopoly in the desktop personal computer operating system market.

Richard Schmalensee, dean of the Sloan School of Management at the Massachusetts Institute of Technology, in Cambridge, Mass., testified that the Intel-based PC desktop operating system was not a "relevant market," because Microsoft is threatened by cross-platform technologies.

The argument lies at the center of the government's case against Microsoft. If no "relevant market" can be identified, then Microsoft cannot have a monopoly, even if Windows runs on 90 percent of the world's PCs.

"The market definition did not coincide with the argument about where competition was taking place," said Schmalensee, calling allegations that Microsoft attempted to forestall other technologies in an effort to hold monopoly power over the operating system a comparison of "apples to oranges."

"Java and Windows are rather different creatures," Schmalensee said.

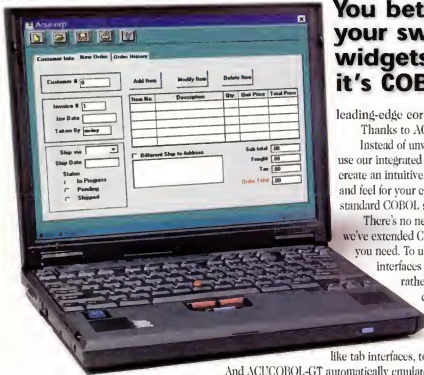
Boies, who defended IBM in its long antitrust battle, took aim at Schmalensee, who has worked intermittently with Microsoft since 1992.

"What companies supply viable alternatives to the PC operating system?" Boies asked at one point.

Schmalensee then listed two "short-run" alternatives that could pose a threat to Windows — the Linux and Be operating systems. The Red Hat version of Linux, an open-source operating system, has an estimated 7.5 million users, and it is estimated that Be has far fewer users.

Elizabeth Wasserman is the Washington bureau chief for The Industry Standard, an InfoWorld affiliate.

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Lucent's Ascend acquisition enables voice-data merger

■ Corporations can reap benefits by restructuring

ON THE SURFACE, Lucent Technologies' acquisition of Ascend Communications last week looks to be merely a shot at Cisco Systems' dominant position in the industry, one that should be of importance only to ISPs and telephone companies. But after you look at the resulting possibilities and general industry trends, you will begin to see that this acquisition is just the latest development in a quickly consolidating marketplace. And though corporations won't be a direct customer of this development yet, it will cause them to reconsider the importance of bandwidth.

For years now, corporate users have been waiting (and planning) for voice and data to come together in one network. Unfortunately, voice and data have rarely coexisted. In most corporations, these roles have been managed by different departments. Even with increased enthusiasm for data pipes due to the Internet, many corporations

still haven't been able to meet on how to merge the two pipes. The voice people have been mildly humored by the concept, and the data managers have sweated blood trying to integrate the two. Even with the promise of voice over IP, most corporations have found the lack of quality and general challenges of integration compelling enough to once again dismiss this concept. So voice and data pipes have continued to remain separate.

Now that Lucent has snatched up Ascend, it is clear that it wants to change that approach. Rather than mirror the strategies of Cisco, 3Com, and other data-oriented leaders, Lucent wants to take a different path. For one, Lucent's genesis as a 1996 spin-off from Ma Bell gives the company credibility on the voice side. Now, with the Ascend acquisition, Lucent has the capability to transform its voice pipes into data pipes. So instead of pushing the rope like many data-driven

vendors have been forced to do, Lucent can pull the large telecom vendors along.

It is these elements that make Lucent's acquisition exciting, as well as the company's timing. Until a few months ago, Lucent was restricted from making such a large acquisition. But fortunately for Lucent, many telecom players are now rebuilding their infrastructures for the next millennium. They are looking at how to handle more information than just voice on their current voice networks. As such, large key vendors will look to Lucent for ways to transform their networks into this more encompassing offering.

And this is a game in which the size and breadth of offerings is very important. Even Cisco, with \$9 billion in revenue, will have an uphill battle, because with the Ascend acquisition, Lucent joins Nortel Networks as the default vendor of choice for telecom companies.

With two proven vendors now getting closer to offering complete solutions, telecom companies will move more aggressively on their plans to morph voice networks into data-capable solutions. And it will be just a few years before these newly rebuilt telecom infrastructures are offered in many possible corporate solutions. But due to existing corporate structures of voice management in one department and data in another, leveraging these developing competitive offerings will be difficult for many corporations.

As a result of growing demands for band-

width, the corporate organization will need to fundamentally change in the next few years. As traditional voice vendors begin to offer an increasing array of data-capable features, corporations need to be structured to best leverage these new competitive options. That means networks, regardless of traffic type, will need to be managed by one group — probably the IT department. Voice will finally become yet another data type for these growing networks.

It is the acquisitions of companies such as Ascend that are making these "voice is just another type of data" visions possible. And this is a very exciting area that has developed in the past two years, and it will continue to accelerate in the next few years. So don't think that the Ascend deal is the end of this industry trend; it is just a major step.

Still, corporations are going to have to ready their networks to take advantage of this trend. So start your engines.

Do you have both voice and data network management in one department? Are your processes for buying voice and data equipment related? Send me your comments.

Mark Tebbe is the president of Lante, an electronic-commerce consulting and integration company that serves clients worldwide, including several high-tech companies. Send e-mail to mtebbe@lante.com.



New \$20 billion voice-data pairing faces off against Cisco

By Stephen Lawson

FOLLOWING Lucent Technologies' \$20 billion merger last week with Ascend Communications, Lucent and Cisco Systems are now fighting to own the combined voice and data networks of the future.

The addition of Ascend has made Lucent, an AT&T spin-off that is steeped in the telephone-network tradition, a viable competitor with aggressive data-networking giant Cisco. Lucent can now take on Cisco with a significant data-WAN equipment line and service-provider customer base.

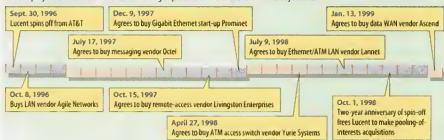
"It's creating the equivalent of the political party system in the networking arena," said John Morency, an analyst at Massachusetts Worldwide, in Lincoln, Mass.

Traditional voice carriers, Internet service providers, and new competitive network providers are converging on combined end-to-end networks that will carry voice, data, and video traffic. These networks hold the promise of providing new services and easier administration, as well as significantly reducing communications costs for enterprises.

Lucent will combine Ascend's assets with its data-networking, optical, and software groups to form the Broadband Networks Group, which will deliver these high-capacity,

Lucent marches into data field

The company made several smaller data-networking acquisitions before its deal last week to buy Ascend.



multiservice networks.

Lucent Chief Operating Officer Dan Stanzone will lead the Broadband Networks Group. Ascend CEO Mory Ejabat will remain with the company during the transition, according to Lucent officials.

For its part, Cisco plans to make the most of its "home-field advantage" in data networking, according to an internal document obtained by InfoWorld. Cisco has been aggressively building a voice-network capability through development and acquisitions, to complement routers that are the linchpins in most wide-area data networks.

"Execution speed is Cisco's ally, where time is Lucent's ally," the document stated.

One user observed the advent of

competition for Cisco.

"They're going to give Cisco a run for their money, and it's good to see competition," said David Brown, an IS manager at the New York Times, in New York, which is a customer of both Lucent and Ascend.

However, Brown and other users said Lucent may have a long road ahead as the company attempts to break into data networking.

"Lucent is worse than AT&T as far as trying to get things done," Brown said. "If Ascend is going to adopt that part of Lucent culture, I wouldn't think their customers are going to welcome that."

In Ascend, Lucent acquires an aggressive vendor that has built a dominant installed base of access concentrators in large Internet ser-

vice provider networks. By acquiring Cascade Communications in 1997, Ascend also became a top provider of the ATM switches at the core of such networks.

According to analysts, Lucent needed the Ascend products to break into the fast-growing ISP market, where its own products arrived late to the game and have not gained much market share.

Lucent already owns the access concentrators of Livingston Enterprises, which it acquired in 1998. Lucent officials said last week the Livingston PortMaster 4, although similar to Ascend's Max products, will be aimed at smaller ISPs going forward.

Observers said the arrival of a true competitor to Cisco is likely to

benefit consumers. Although traditional Lucent rival Nortel Networks acquired a data-networking arm in 1998 by purchasing Bay Networks, the company still lacks many pieces of the end-to-end puzzle, according to some analysts.

Part of the battle will be over network software, for example, where Cisco's Internetwork Operating System will go up against Ascend's Navis and IP Navigator.

"I think it's going to be extremely challenging for Nortel to compete head-to-head with Cisco and Lucent's management systems," Morency said.

Lucent's resources, name recognition, and success record make the company a heavy hitter, according to analysts.

"[Lucent has] every intention to move from the telecom and carrier space into the enterprise," said Mike McConnell, an analyst at Infonetix Research, in San Jose, Calif.

A series of acquisitions since its spin-off have earned Lucent a modest product set in enterprise networking that could be lined up with service-provider infrastructures. (See chart, above.)

Lucent Technologies Inc., in Murray Hill, N.J., can be reached at www.lucent.com. Ascend Communications Inc., in Alameda, Calif., can be reached at www.ascend.com.

Laura Kujubu contributed to this article.

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Windows

Continued from page 1

Michael Gartenberg, an analyst at the Gartner Group, in Stamford, Conn.

According to Ed Muth, group product manager for enterprise marketing at Microsoft, Release Candidate 1 (RC1) for Beta 3 of Windows 2000 will be released in March of this year, and therefore Beta 3 will not be released at least until April. RC0 was released in December 1998. Muth would not discuss a final ship date for Windows 2000.

Several factors have come into play for this latest of many delays, and the complexities of Microsoft's Active Directory services and IntelliMirror technologies are at the top of the list.

But delays begot more delays, and as the industry continues to push ahead without Windows 2000, Microsoft is aiming at a moving target, observers said.

"The hardware is rapidly changing underneath it, which makes it almost impossible to complete the product they outlined," said Rob Enderle, a senior analyst at the Giga Information Group, in Santa Clara, Calif.

For instance, Intel's Pentium III will not be available until March 1, and the mobile version of the chip will not debut until the last quarter of the year at the earliest, according to Enderle. Microsoft is touting Windows 2000 as the first NT system designed with both mobile and desktop users in mind.

"The Pentium III timing, coupled with Y2K overhead and the fact that this is the most complex and largest product ever attempted, is weighing heavily," Enderle said. "I don't know of another product that has more lines of code than this."

One source, who asked not to be named, added that "the creeping internal 64-bit stuff in the beta versions have been seen, along with reworking the whole OS with Windows 2000 naming instead of Windows NT—[and] rewriting codes, online help, scripts, etc., seems to be a factor in the slippage."

Steve Berman, Microsoft president, and Brian Valentine, newly promoted vice president of Windows development, are the driving forces behind the Windows 2000 machinations.

Ballmer, who has taken responsibility for product shipping dates, nixed a fourth-quarter release of Windows 2000. And once Valentine evaluated what features would have to be omitted to accommodate a June 1999 release, the February 2000 date—as well as the possibility of an interim release—became

NT placeholder?

According to sources, Microsoft is mulling an interim release of Windows NT this year, which would include virtually everything in Windows 2000 except the most onerous features.

- Active Directory upgrade to current NT directory services
- IntelliMirror advanced replication technology
- The new driver model

a reality, according to sources.

An interim release without the complete functionality that was originally promised in Windows 2000 would be a mixed bag to many IT managers, but Muth said Microsoft has no immediate plans to offer one.

"The absence of Active Directory would be very hurtful if that [absence] included things like IntelliMirror and the object repository," said Roger Abell, technology support assistant coordinator for the Arizona State University School of Engineering, in Tempe, Ariz. "On the other hand, an NT 4.5 could be a welcome thing. But there is so much pinned on Active Directory that [its absence] would give a lot of pause for thought."

Microsoft Corp., in Redmond, Wash., is at www.microsoft.com.

Michael Vizzard, *Cara Cunninghamham*, and *Stannard Holt* contributed to this article.

MCI WorldCom

Continued from page 1

product marketing at MCI WorldCom.

In addition, customers can monitor network traffic to make sure MCI WorldCom abides by a service-level agreement. Business customers can also order new products, such as pagers, phone lines, and calling cards, as well as provision services online.

Interact is available immediately to MCI business customers at no extra charge.

"This lets customers have access to our products and be the enabler, as well as the controller, of different aspects of these services," McMurtree said. (See "MCI WorldCom sets up shop," www.infoworld.com/printlinks.)

Sprint and AT&T were both unavailable for comment. However, observers said AT&T has similar components but does not yet offer a comprehensive package.

Users were enthusiastic about the

Messaging

Banyan yields to Microsoft in software alliance

By David Penderly

IN A MOVE THAT could steer Banyan networking customers into the Microsoft camp, Banyan Systems and Microsoft cemented a strategic alliance last week to more completely integrate messaging, networking, directory, and Internet products, while simultaneously developing Banyan-to-Microsoft migration tools and services.

To quell conjecture of whether Banyan technology would be used to enhance or replace Microsoft products—notably whether Banyan's StreetTalk directory technology would be used within Microsoft's yet-to-be-released Active Directory—the companies stressed that their announcement was not a technology exchange.

Rather than using Banyan technology from its BeyondMail, Vines, and StreetTalk products, the aim is to transition Banyan customers to competing Microsoft products, the companies said.

"In looking for a [partner] that could bring products that our customers would utilize and eventually migrate to, customers told us loud and clear that Windows NT was their platform of choice," said Bill Ferry, chairman and CEO of Banyan.

At your service

Banyan's Microsoft-centric consulting services include several features.

- Banyan BeyondMail/Microsoft Exchange mail integration and migration
- Banyan Vines/Windows NT integration and migration
- Banyan StreetTalk directory planning, design, and integration with Microsoft Active Directory
- Internet application development and integration

The two companies' development, interoperability, and migration work will be complemented by Microsoft's \$10 million investment in Banyan, which will be used to boost Banyan's service capabilities. Banyan said it will use the money to add 500 Microsoft-certified service technicians to its service organization, which will work in conjunction with Microsoft Consulting Services.

The two service groups will collaborate on the design and delivery of packaged service and support offerings that support Microsoft's enterprise platforms.

Codevelopment and technology sharing could be inevitable, however, with the companies promising ambitious initiatives that in-

clude an integrated messaging infrastructure, directory synchronization and migration tools, and cooperative work to design and implement Internet infrastructure and Web application solutions.

One analyst said the alliance will enable Banyan to focus on becoming the service provider it has aspired to be, after a difficult journey through treacherous markets in recent years.

"This is very definitely an opportunity for Banyan. If you want to be a services company, one of the best ways is to partner with Microsoft," said Chris Le Tocq, an analyst at Dataquest, in San Jose, Calif.

One Banyan customer sees changes coming.

"To me, it signifies that Banyan does not seem to be making long-term plans to make a separate NOS," said an IT director at a U.S. trade agency. "My impression is that they are trying to get into the tools market as opposed to being a one-stop vendor. Strategically, this is not a bad idea for Banyan. It's the way it has been drifting for years."

Banyan Systems Inc., in Westboro, Mass., can be reached at www.banyan.com. Microsoft Corp., in Redmond, Wash., can be reached at www.microsoft.com.

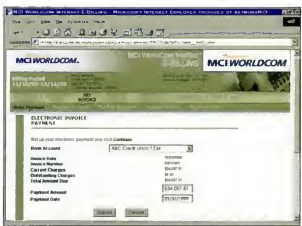
ability to take telecommunications matters into their own hands.

"It sounds like a very interesting system," said Erik Salmonson, an IS manager at Zimmermann Crowe Design, in San Francisco. "Having the option to make changes yourself and for the changes to take effect right then is nice. Then you don't have to get on the phone and wait an hour to change just a checkbox on a [MCI] account."

Analysts also praised Interact.

"This is the deployment of applications and services that genuinely empower an organization," said Jilani Zerbi, an analyst at Current Analysis, in Sterling, Va. "Everyone has fiber in the ground, but it's another thing to say you're enabling the network to give applications that customers want and need—that's where the coup for MCI WorldCom is."

Eileen Eastman, an analyst at the Yankee Group, in Boston, agreed, and also noted that the real-time traffic monitoring is a plus, as "customers don't want someone telling them what happened—if there's



MCI WORLD.COM INTERACT lets users submit payments to MCI from their bank accounts via electronic fund transfers.

an issue or a problem. They want to know it now and address it now."

In addition, users and analysts specifically applauded the network management element.

"Traffic goes up after having our Web site showcased on TV or radio, so if we could easily allocate 50 percent more bandwidth, that sounds good," said Keith Waldorf, chief information officer at the Employers' Medical Network, in

Sacramento, Calif.

"Bandwidth-on-demand in whatever way one can get it is something everyone has been after for some time," Eastman said. "Overall, customers have been dying for this kind of system, and my only criticism [about Interact] is why did it take so long?"

MCI WorldCom Inc., in Jackson, Miss., can be reached at www.mciworldcom.com.

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The company augments its tool chest with IBM's MQSeries, another mechanism for integrating NonStop Himalaya with Windows NT, which has the added benefit of integrating IBM platforms such as a mainframe. Compaq has also chosen CA-Unicenter to help manage the new integrated environments from a common console. Remote Server Call (RSC), another interoperability tool, allows Windows 95 and Windows NT to access legacy Pathway/TS transaction processing applications on NonStop Himalaya servers.

A coherent roadmap

It is hard to find a supplier that offers more than just a few Windows NT-based tools and a cadre of integration services personnel who are truly expert in the arcane needed to integrate Windows NT with past enterprise systems. But Compaq's Tandem Division stands out for creating a coherent roadmap for transforming Windows NT servers into reliable, scalable platforms and for integrating them in a NonStop Himalaya environment that can be used in accordance with the dictates of the best enterprise business processes.

The company has also delivered the products that flesh out this architecture. Its NonStop Software middleware and development tools are geared toward building and managing applications—on the Internet, in more traditional client-server architectures, or in new combinations. Not only will developers be able to write an application once and use it on different platforms, these applications will be able to incorporate the value of Windows NT without having to lessen the value of the enterprise's other processors to do so.

In integrating Windows NT into the enterprise, as it applies to NonStop Himalaya, Compaq has no real competition. But in the larger endeavor of winning new business based on Windows NT integration prowess, the company will have to battle suppliers such as Hewlett-

Packard, IBM, NCR and Sun Microsystems. When the contest involves complex integration issues involving legacy systems, many of these hardware competitors are on equal footing. . . particularly IBM. When the integration is focused more narrowly, other competitors emerge, each having their own strengths.

HP, for example, augments its professional services with network and systems management integration, and has entered into partnership programs with Microsoft to keep Windows NT-based systems up and running. HP also works with Microsoft on building directory services and mail services that are common to both companies.

Conclusion

The Tandem Division's 1996 shift to embrace Windows NT has matured into its current NonStop Best of Both initiative. While this means Microsoft and the Tandem Division can be said to compete in the area of Windows NT middleware (i.e., high availability and OLTP), Compaq dramatically up-enters the reach of Windows NT applications. Such is "cooperation."

But when it comes to Windows NT integration, all the competitors of the Tandem Division are still largely in the development labs with respect to clustering, which Aberdeen regards as critical for enterprise scalability and robustness. HP, for instance, has no answer to Compaq's clustering and high availability.

Prior to its merger with Compaq, Tandem, to its credit, gave Windows NT clustering many of the characteristics of its NonStop Himalaya systems. This feature should not be underestimated, for Tandem has clearly paid its dues, transaction by transaction, and has demonstrated that NonStop Himalaya is among the most scalable and robust processing complexes in the world.

Enterprise decision makers would do well to look for these integration solutions from Compaq. ♦



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robustness.

► About the author

Wayne T. Kernochan is senior vice president of platforms for Aberdeen Group, Inc., a consulting and market research firm in Boston. Mr. Kernochan implements Aberdeen's Buying Guides for distributed, open RDBMSs and client-server application development environments, as well as consulting projects for Fortune 1000 clients and leading hardware and software vendors.



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ANNOUNCED

SILICON GRAPHICS joined the ranks of Windows NT workstation vendors last week when it unveiled its 320 and 540 Visual



Workstations. The 320 accepts dual Pentium II 450-MHz processors, 1GB of error-correcting code of synchronous DRAM (SDRAM), and a 14.4GB hard drive for prices starting at \$3,395. The 540 accepts as many as four Pentium II Xeon processors, 2GB of error-correcting code of SDRAM, and an 18GB hard drive for prices starting at \$5,995. The company also announced the Silicon Graphics 1600SW flat panel monitor, with a 17.3-inch wide, 1,600-by-1,024 pixel resolution SuperWide screen. The systems are designed for the manufacturing, entertainment, government, and communications industries. Silicon Graphics Inc.: www.sgi.com.

HEWLETT-PACKARD will this week announce a line of thin and light notebooks dubbed as the Omni-Book 900



series. The four-pound, 1.25-inch thick systems will include Pentium II processors, 4.3GB to 6.5GB hard drives, 32MB of RAM, and a 12.1-inch active-matrix display that starts in price at \$2,500. In order to receive support and hardware costs, all 900 series notebooks will use the same module bay and docking stations as the 4100 series notebooks. Hewlett-Packard Co.: www.hp.com.

TALK BACK

To contact EIC/Server section writers, send e-mail to firstname_lastname@infoworld.com.

PC prices continue to head south

■ \$399-priced desktops make a play for the enterprise

By Ephraim Schwartz

THE COMPANY that pioneered the less than \$500-priced desktop, emachines Corp., will launch a raft of new PCs with prices starting at \$399 this quarter.

After selling out of its first production run of nearly 200,000 systems through consumer channels, emachines is now setting its sites on the business market and already has a number of corporate customers for its etower 300C.

"After our IT department qualified them, we bought 50, and now we'll buy another 50," said Judy Hauenstein, vice president of sales and marketing at Transport Logistics, a transportation and logistics company in Wichita Falls, Texas.

For a price of \$700 each, the

company bought systems with 300-MHz Celeron processors from Intel, a 17-inch monitor, and an Ethernet card, and has had no support problems to date, according to Hauenstein.

"We were amazed at the price performance of these systems," Hauenstein said.

Some corporate IT managers may be looking to use the systems for tasks other than traditional PC uses.

"It is less [expensive] than a thin-client terminal. If [emachines] threw in a Citrix client, that would be an interesting product," said Rick Smith, chief information officer at the Chesapeake Factory, in Calabasas, Calif.

"As a stand-alone terminal on a receptionist's desk, I would consid-

er it," Smith said.

Despite the eyebrow-raising prices and early IT interest, industry analysts remain adamant in their belief that most business users will not bite.

"The issue isn't so much price. The issue is the risk of using an untried system," said Rob Enderle, an analyst at the Giga Information Group, in San Jose, Calif. "IT managers would be putting their job on the line."

À la Apple's iMac, emachines is planning to launch an all-in-one business system in the second quarter that company President Stephen Dukker said he believes will appeal to the commercial market.

"The estate will sell between \$699 and \$799, use a Celeron 366-MHz or 400-MHz chip, and include a 10/100Base-T Ethernet connection," Dukker said. "The estate is a thin-client killer."

The estate will include a built-



THE ETOWER 300C, from emachines is lowering the price bar for desktop PCs to \$399.

in 15-inch monitor, a 4.3GB hard drive, 32MB of synchronous DRAM (SDRAM), and will ship late in the second quarter.

The company will be upgrading the etower with an Intel Celeron 333-MHz processor priced at \$499, which will also include a 3.2GB hard drive, 32MB of SDRAM, a 24-speed CD-ROM drive, a 56Kbps V.90 modem, Windows 98, 4MB of video RAM, two Universal Serial Bus ports, a keyboard, and a mouse. The systems will ship by the end of the month.

emachines Corp., in Fremont, Calif., is at www.e4me.com.

Application development

Rational consolidates tools

By Dana Gardner

RATIONAL SOFTWARE in early February will deliver a revamped and reorganized set of its 10 products to form Rational Suite, a unified platform designed to bind development teams together for creating applications better and more quickly.

Targeted primarily at the Microsoft Visual Studio and IBM VisualAge audiences, Rational Suite consists of upgraded Rational products that are linked on the server level to offer integration of the various products used in development — from modeling to debugging to testing.

"If you've got Visual Studio, you're in a prime category for Rational Suite," said Mike Devlin, president and co-founder of Rational. "We're also talking about someone working on a team. A cowboy working on their own is fast becoming an antiquated thought."

Rational Suite — including Rational Rose, Rational TeamTest, and Rational RequisitePro — comes in four editions: AnalystStudio, DevelopmentStudio, TestStudio, and Enterprise, all coordinated and linked via Rational's Team Unifying Platform and Team Integration

Architecture.

The linking is accomplished by Rational Domain Server Interface, which provides a common interface to the different repositories or domains of data stored by various tools across Rational Suite.

The overall goal is to architecturally eliminate problems in team development that are often encountered when nonintegrated tools are used by factions across a development team, said Eric Schurr, general manager of Rational Suite.

Rational is also consolidating the pricing of its products and simplifying the licensing. A single-licensing agreement on a single CD brings the entire 10-tool pallet of Rational Suite to users for a price that reflects the previous price of any five of the individual tools, Schurr said.

Pricing for Windows NT versions of Rational Suite AnalystStudio is \$3,295; Rational Suite DevelopmentStudio costs \$5,295; Rational Suite TestStudio costs \$5,295; and Rational Suite Enterprise costs \$7,495. DevelopmentStudio will be available on Unix at a floating license price of \$10,590.

Rational Software Corp., in Cupertino, Calif., can be reached at www.rational.com.

STREETPRICES Pentium desktops

FOR THE WEEK OF JAN. 10

350-MHz Pentium II system*	Hard drive	Low	High	Average	Change from December
AST Bravo MS 8350	6.4GB	\$1,347	\$1,584	\$1,450	-11%
Compaq Deskpro EP M6400	6.4GB	\$1,535	\$1,716	\$1,597	-5%
Dell OptiPlex G1+	4.3GB	Direct Price		\$1,384	10%
Gateway E-3200 350	6.4GB	Direct Price		\$1,221	None
HP Vectra VL8	4.3GB	\$1,508	\$1,720	\$1,622	-3%
IBM PC 300PL	4.2GB	\$1,379	\$1,669	\$1,554	-3%
Micro Millennium 350	8.4GB	Direct Price		\$1,399	-1%
Toshiba Equium 71000	4.0GB	\$1,487	\$1,570	\$1,521	-2%
Compaq/compatibles*	6.4GB	\$ 989	\$1,429	\$1,160	-2%
PowerPC system*					
Apple Power Macintosh G3 Desktop	6.0GB	\$1,595	\$1,729	\$1,617	N/A†

THE LINEUP

Product	Last priced	Next pricing	Products	Last priced	Next pricing
Printed scanners	Jan. 30	March 3	Multimedia printers	Jan. 23	March 1
Net drives	Nov. 2	Feb. 22	Desktop desktops	This week	Feb. 15
Isis jet printers	Nov. 2	Feb. 1	Pentium notebooks	Dec. 14	Apr. 8
Laser printers	Dec. 28 / Jan. 4	March 29	RAM	Oct. 26	Jan. 25
17-inch monitors	Dec. 7	March 29	Servers	Jan. 11	April 5

All recent Street Prices listings are available at www.infoworld.com. Infoworld Street Prices are based on telephone surveys of resellers, online resources, and print advertising in computer publications and regional newspapers. Price information was collected between Jan. 3 and Jan. 10.

1. Pentium systems include Windows, keyboard, a mouse, 64MB of RAM, a CD-ROM drive, and a 15-inch monitor.

2. Celeron and compatibles are systems with the same features as those listed by name, but they are not as widely available.

3. The Apple system includes a 300-MHz PowerPC G3 processor, 64MB of RAM, System 8.5 mouse, keyboard, and a CD-ROM drive, but does not include a monitor.

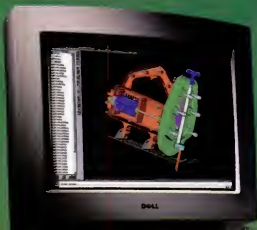
4. Model not included in December pricing survey.

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Microsoft unveils BackOffice, Small Business Server betas

By Bob Trott and Dan Briody

MICROSOFT HAS FURTHER integrated the members of its BackOffice Server suite in Version 4.5, now in beta testing, and is aiming the suite at midsize businesses and branch offices.

BackOffice 4.5 — which consists of SQL Server 7.0, Systems Management Server (SMS) 2.0, and Windows NT Server 4.0 with Service Pack 4 — includes a set of consoles designed to let IT administrators better manage common tasks and speed deployment.

The BackOffice Server Manager tool, based on the Microsoft Management Console, can be customized to incorporate in-house or third-party management tools.

BackOffice Server targets Web developers, according to Microsoft officials, by automatically setting up an intranet starter site with seven starter applications.

New to Version 4.5 is the BackOffice Server deployment wizard, which IT managers can use to replicate a single server script across multiple servers; reusable setup scripts; and a branch office setup scenario feature that automatically sets proper configurations for a remote location, such as joining with an existing Exchange Server site, or setting up a secondary SMS site.

To complement the BackOffice beta release, Microsoft officials also announced the public availability of its Small Business Server (SBS) 4.5, beta version.

Like BackOffice, the basic elements of the SBS have not changed from Version 4.0, which includes Windows NT Server, Exchange, SQL Server, Proxy Server, and fax and modem sharing capabilities. However, all of the individual elements have been upgraded, and the new version includes several VAR-friendly elements to aid in installing and con-

figuring the product, according to Jennifer Cioffi, group product manager at Microsoft.

Microsoft doubled the workstation limit from 25 to 50, expanded the ISP options, and improved the manageability features of Version 4.5.

"It is in pretty good shape," Cioffi said about the beta version, which is expected to be in its final version by the second quarter. Pricing is not expected to stray far from the current model of \$1,499 for the first five users and \$309 for each additional group of five.

Microsoft plans to release BackOffice Server 5.0 in the same time frame as Windows 2000, formerly called NT 5.0, although that release date is up in the air.

Microsoft Corp., in Redmond, Wash., can be reached at www.microsoft.com.

► See the review of Small Business Server 4.5, beta at www.infoworld.com/printlinks.

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THE BUG REPORT

Bugs and fixes reported to BugNet

► **Lotus** plugged a memory leak in Domino Server 4.6.2 that was in earlier versions of 4.6.x. If you sent an outbound message through the SMTP message transfer agent, and it had blind carbon copies, or bcc, you lost 2KB of memory.

► **Novell** has released Support Pack 1 for NetWare 5. In addition to some new features, Novell has added some split-horizon fixes in SCD, and improved many services. The complete list of file updates can be found at support.novell.com/cgi-bin/search/bldfinder.cgi?2945884.

Found a bug? Tell the InfoWorld Electric Forum at forums.infoworld.com. For more bug reports, answer to www.bugnet.com, or send e-mail to bugnet@bugnet.com.



WINDOW MANAGER: BRIAN LIVINGSTON

Utilities can help you monitor and manage Windows NT, Win98

IF YOU'VE EVER WISHED you could look inside your Windows or Windows NT system to see what's really going on in there, monitoring utilities can help. Some of my favorite utilities have been recently updated. Here is a look at a few of them.

■ **SuperMonitor.** This utility, now included Version 2.0 of Tessler's Nifty Tools, is avail-

able for Windows NT and Windows 3.1/95/98.

SuperMonitor displays in real time your system's RAM usage, its virtual memory, and those essential 64KB "resource heaps" called User and GDI, which stands for Graphics Device Interfaces. These are helpful in tracking down



programs that have "memory leaks." Such programs can make your system sluggish as the day progresses by failing to release all of their resources when they are finished using them.

SuperMonitor is similar to two utilities provided with Windows 95/98: Resource Meter and System Monitor. (To find them, click Start, Programs, Accessories, System Tools.) But there are important differences. SuperMonitor lets you open a monitoring window and "freeze" its initial statistics. You can then start another window to use for comparison while opening and closing applications. This can help you pinpoint an application that is leaking resources.

SuperMonitor also allows you to save a log file to disk, just as System Monitor does. But you get much more detail and greater control over the information included in the log file.

The free version of SuperMonitor allows you to watch your system for 5 minutes at a time. The \$39 registered version allows unlimited monitoring.

For download and order information, see www.niftytools.com.

■ **WinTop (Kernel Toys).** To determine the amount of CPU-time each of your running applications is consuming, you need WinTop. This utility can remain on top of all windows while you launch different applications to see how much CPU-time each uses.

This information is invaluable in tracking down inefficient programs that slow everything else down. Using WinTop, I found that an old version of a program consumed 50 percent of a Pentium's CPU-time, but a newer version consumed only 5 percent.

WinTop runs under Windows 95 and 98. A similar feature is built into NT on its Processes tab.

WinTop is part of a free download from Microsoft called Kernel Toys. Go to www.microsoft.com/windows95/downloads/contents/wutoys/w95kerneltoys/default.asp and click Download Now. The Web page says Kernel Toys is not intended for Windows 98, but I've run WinTop on Windows 98 with no problems.

■ **Process Viewer.** This free tool enables you to view the priority level and DLLs used by each running process. You can kill an errant window or attach a debugger to a running application to troubleshoot DLLs.

Download Process Viewer from www.teamcti.com/pview/prview.htm. It works under Windows NT or Windows 98/95, but to run it on NT may require a support file known as Psapi.dll (which may already be installed). That file can be downloaded from www.winutils.com/psapi.dll.

■ **WinKill.** Although Process Viewer has the capability to shut down an application, the king of viewer/terminators is WinKill. It doesn't merely close one application. It can close them all.

WinKill is a free download available from www.users.zetnet.co.uk/jamesbray.

Brian Livingston's latest book is *Windows 98 Secrets (IDG Books)*. Send tips to brian_livingston@infoworld.com. He regrets that he cannot answer individual questions.

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SHIPPING

CISCO SYSTEMS last week extended its desktop switch offerings with five Cisco Catalyst 2900 Series XL models. The switches can support virtual LAN trunking and include expanded memory capacity to support software features. The switches include 12- and 24-port 10/100Mbps models with expansion slots, and a 12-port full-fiber switch for aggregation. Gigabit Ethernet and ATM modules will ship this spring. The switches are shipping now, priced beginning at \$1,795. Cisco Systems Inc.: www.cisco.com.

ANNOUNCED

CABLETRON last week announced a fiber-optic Token Ring module for its SmartSwitch 9000 switch platform. The 9742B-16 switching module provides 16 full-duplex ports and wire-speed switching capacity. The company also announced that the SmartSwitch 9000 can switch traffic between Token Ring and Ethernet or ATM segments at wire speed, providing enterprises with a smooth migration path from Token Ring to other technologies. The module is shipping now, priced at \$19,995. Cabletron Systems Inc.: www.cabletron.com.

GNUPRIVACYGUARD

GNUPG, a beta-test version of a freeware encryption program, has been released via the Internet by a German software programmer. GnuPG runs on Unix and features 128-bit encryption. The program is also compatible with Pretty Good Privacy (PGP), Versions 2.0 and 6.0, and can send and receive PGP-encrypted messages. Because GnuPG was developed outside the United States, it does not fall under U.S. government encryption restrictions. The copyright to the GnuPG program is held by the Boston-based Free Software Foundation. More information on GnuPG is at www.gnupg.org.

TALKBACK

To contact Networking & Telecom section writers, send e-mail to firstname_lastname@infoworld.com.

SWAT teams gather to duel viruses

Continued from page 1

WorldCom contracted the Remote Explorer virus, which affects Windows NT machines and encrypted data.

To combat the virus, NAI called on its anti-virus researchers in the United States, Japan, and England to fix the damage. The company even recalled a team manager from vacation in Mexico.

"That is the job. The guy carries a beeper. The customer has a problem, and the customer wants it fixed now," says Peter Watkins, general manager of the Net Tools Secure division at Network Associates, in Santa Clara, Calif. "The guy we had to pull back from Mexico was the manager of the lab. This is the guy that has to determine the priorities. We just pull them in. You have to."

No longer is it enough to purchase anti-virus or intrusion-detection software and install it on a network. Users must now evaluate security vendors' capability to address a new virus or attack and quickly respond with a fix to the problem.

"As the networks become ever more intertwined and the code becomes more self-replicating and vicious, the amount of damage is growing exponentially," says Jim Balderston, an industry analyst at Zora Research, in Redwood City, Calif. "The key, now and into the future is shrinking response times so the damage can be limited or minimized."

As customers evaluate possible security solutions, most SWAT teams point to several key points of differentiation of which to be aware.

- What is the size and availability of the team?
- What kind of turnaround time does the group usually have on viruses?
- What is the ease of attaining updates for products?
- Do they provide the services you need to keep up and running?
- Which platforms do they support?
- What is their virus-detection

track record?

But SWAT team members often enjoy the challenges of their positions regardless of strange hours and extreme demands.

"I love my job," says Vincent Gallot, manager of Anti-Virus Emergency Response Team at Network Associates, in Beaverton, Ore. "It's definitely what we live for. Most of these people are hard-core anti-virus people. A lot of them eat, sleep, and breathe these sort of things."

"I love my job," says Carey Nachenberg, chief researcher on Symantec Anti-virus Research Team, or SARC, at Symantec, in Santa Monica, Calif. "I look forward to every day. It's actually quite challenging."

Users dealing with security issues, however, expect this level of commitment when it comes to getting networks back online after a virus attack.

"Any kind of company that deals with the ongoing threat of viruses would have some system in place where if we came to them with a virus they would come to us with a fix," says a virus security administrator at a large software publication company in California, who wished to remain anonymous. "You don't hear a lot of stories about viruses, but our company has been passing a lot of viruses lately. Thankfully none that have been very malicious."

The simple fact is, however, if a major virus hits, the first thing most administrators will do is remove their systems from a network.

That leaves users without network access and unable to conduct business as usual, and a company at a standstill is a company not making money.

"Basically if you don't have to wait and your users don't have to wait, that's important. Turnaround time is going to be critical in this field," says SARC's Nachenberg. "Every minute that an IS manager is waiting, they have people who are waiting to get their systems back."

SARC has an average response

Chronology of the Remote Explorer virus

Dec. 17, 1998 Network Associates' Anti-Virus Emergency Response Team (AVERT) branch of NAI Labs was approached by MCI WorldCom, where the virus was found.

Dec. 17, 1998 AVERT received samples at approximately 6 p.m.

Dec. 21, 1998 Removal and inoculation was made available to the public at 8 a.m. after being tested in the customer environment.*

*Total AVERT labor hours for the project were approximately 200 to 225.

time of 19 hours. In an effort to cut response times to virus alerts, SARC is working with IBM to create and perfect a digital immune system that will use computers to scan, identify, and fix viruses without the need for human intervention.

"Rather than humans doing the analysis, we're going to have computers do it," Nachenberg says. "That way we won't have to come back from our vacations."

NAI has set the bar high for itself and is taking a slightly different approach, according to Watkins.

"I'd like to get that cycle time to less than six hours," Watkins says. "Over the next year, I'd like to have some of our electronic analysis tools onsite on the server."

"What I'm doing here is having more points of analysis near the customers, because the key here is quick containment," Watkins adds.

Internet safety

HOT SEAT

RSA's Jim Bidzos touts the company's Internet encryption technology and defends royalty policies



WITH INTERNET commerce boosting customer interest in encryption technology, RSA is enjoying the position of encryption provider to most major software manufacturers. Recently, *InfoWorld* Executive News Editor Michael Vizard and Senior Writer Matthew Nelson sat down with Jim Bidzos, president

and CEO of RSA Data Security, to discuss the future of encryption in communications.

Do you perceive that the whole issue of security has moved from a niche arena to more of a mainstream IT issue?

Absolutely. The CEOs of Fortune 1000 companies are absolutely

» BIDZOS page 42



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Storage

Auspex readies server, management plan

By David Pendery
AFTER a turbulent 1998, in which it missed key product releases, which led to broad company restructuring, Auspex Systems is re-emerging with a new line of network attached storage (NAS) products; partnerships with storage management platform vendors; and a renewed focus, which the company will announce next week.

"[Last year] was a difficult year. We told customers we would deliver [new products], and did not deliver on that promise," said Fred Wiele, Auspex's vice president of marketing. "However, we're changing Auspex's approach, with a full-operation product line."

"The two technologies I see emerging that will change the storage profile are storage area networks (SANs), which are coming slowly, and NAS, which has benefits of SANs for unstructured data not sitting in a database," Wiele continued.

"Traditionally a higher-end vendor, Auspex for the first time will offer workgroup and departmental servers, called the 4Front family of NAS file servers as part of a new enterprise server that also includes the NS2000 Enterprise NetServer.

The NS2000 has two Pentium CPUs and as many as three RAID controllers powered by RISC processors. Built on a nodal archi-

Auspex server components

NS2000	AS200	AS100
RAID 0, 1, 5	RAID 0, 1, 5	RAID 1
Three 18GB disks	Two 18GB disks	Two 18GB disks
Four 10/100 Base-T single GB Ethernet, or FDDI connections	Two 10/100 Base-T connections	One 10/100 Base-T connection
Redundant power supplies	Redundant power supplies	One power supply

ture, NS2000 servers provide as much as 4.5 terabytes of storage, supporting as many as 5,000 users.

In the 4Front family, the departmental AS200 server is designed for as many as 200 users and provides as much as 291GB of storage. The workgroup AS100, meanwhile, has storage capacity expandable to 109GB.

Network File System, Common Internet File System, and HTTP file-handling protocols are embedded into the 4Front products' data delivery engines, making for faster and more comprehensive data access by Windows NT and Unix servers, Auspex officials said.

The new servers can be administered using a Web browser. Use of these and other functions of the products also will now be accessible by way of Veritas and Intelligent storage management software, with Auspex set to announce alliances with these vendors.

Auspex will incorporate for the first time the Network Data Management Protocol into the new products, providing better access and integration with the Veritas and Intelligent platforms, as well as

Network Data Management Protocol platforms under development by other vendors, including IBM, Auspex officials said.

Pricing will start at \$76,950 for the NS2000 Enterprise

NetServer with 54GB of disk storage. The AS100 pricing will start at less than \$16,000, and less than \$32,000 for the AS200; both include 36GB of storage and 10/100 Base-T network interfaces. The 4Front line will ship in March.

Auspex Systems Inc., in Santa Clara, Calif., can be reached at www.auspex.com.

Sun forms business unit and partnerships in telecom market

By Marc Ferranti

HOPING TO MOVE AHEAD in the telecommunications market, Sun Microsystems announced last week a business unit, products, and services for network service providers and carriers.

In addition to introducing its Netra ft (fault-tolerant) 1800 server (see "Sun elbows into the telco space," Jan. 11, page 18), Sun revealed its Network Systems business unit, which is responsible for developing products and programs to meet the requirements of network equipment and service providers, Sun officials said.

Along with its flagship Netra ft 1800 product, the Network Systems

unit will also pitch Solstice Enterprise Manager 3.0. This version incorporates the Java development environment, and it is being touted as a way to manage software upgrades to switching equipment.

Sun also announced alliances with vendors and service providers, including IBM, Bellcore, and Trillium Digital Systems, that will help Sun provide telecommunications services applications such as switch control and signal processing.

The three companies will support Sun's Java Advanced Intelligent Networks (JAIN) initiative. Sun officials said. (See "Sun answers a phone call," www.infoworld.com/printlinks/). JAIN is intended to be a telecommunications networking application development framework, based on Sun's JavaBeans component architecture.

Dataquest analysts said they see Sun as a formidable player in the telephone company market, given Sun's background in telecommunications and Unix. In addition, the timing is right, because Microsoft's Windows NT is struggling for acceptance as a carrier-class OS, according to Dataquest, in San Jose, Calif.

Sun Microsystems Inc., in Palo Alto, Calif., is at www.sun.com.

Marc Ferranti is the New York bureau chief for the IDC News Service, an InfoWorld affiliate. Laura Kujubu contributed to this article.

REGULATORY ROUNDUP

A telecommunications newsbyte from the United States



WASHINGTON The Telecommunications Division of the Federal Communications Commission's International Bureau earlier this month approved carrier requests to provide services over private lines that are interconnected to the public switched network between the United States and Hong Kong. This approval is expected to lead to reduced telecommunications rates in all parts of Asia, according to FCC officials.

Now, all authorized carriers can provide switching services over their facilities-based or resold private lines between the United States and Hong Kong. U.S. carriers can now send 45 percent of all U.S. international traffic outside of the traditional settlement system, allowing them to offer international service at lower rates.

This action is expected to increase rate competition for international telecommunications service to all parts of Asia, according to the FCC. So far AT&T and MCI WorldCom have filed notifications with the FCC of accounting rate reductions.

Bidzos

Continued from page 39

aware of and looking at [budgetary] security allocations.

Are most companies focused more on internal or external security threats?

The internal threat is currently bigger and far more real than the external threat. The external threat, though, you want to be careful not to minimize and not to blow out of proportion.

There has been a fair amount of controversy over how much of RSA technology should be open, what the royalties are, and other issues. Are these real issues or just noise?

Today it absolutely is noise. It used to be more of an issue years ago. The fact is we have very good technology; we have scrutinized,

proven, and trusted technology and people want to use it.

A large part of the [encryption] community seven years ago was comprised of folks who believed that software should be free and intellectual property should not exist.

They're going to find that it is not a measurable part of the cost of any product.

What is the pace of technology in encryption?

Encryption is a crucial Internet technology, and we all know about Internet time moves. Yet, encryption can't move that fast. In this business, you don't want to be the first on your block to get the newest thing. This is all about trust, about proven technology, about tried and true, about scrutinized, evaluated, and beat on. And

only then do you want to bet your business on it because whether you admit it to yourself or not, if you incorporate encryption in your product or your service and get out there and start making this product or service available to business users on the Internet, you are betting your company on the strength of that encryption.

"Essentially, [our goal is] to be the

Dolby, so to speak, of the encryption business."

If RSA has been tested and then broken during competitions, how can it still be secure or require longer key lengths?

The assumption is that stronger computers work against the use of these algorithms. Because the

stronger the computers get, you've got to start using these giant keys and then it gets impractical. This was, for example, one of the arguments advanced about elliptic curve. It offers the smaller key relative to RSA, so you don't have all this processing requirement.

Let me explain to you the interesting fallacy in that logic. The difficulty of breaking an RSA number, as the size of the keys gets larger, grows exponentially. However, the difficulty of doing the encryption and decryption grows only in a linear manner. So the very fact that the difficulty of breaking RSA grows exponentially with the size of the key, while computation requirements don't grow so fast, is precisely what makes it desirable for a public key infrastructure.

What do you think will really blast onto the scene at the RSA conference this week, and where do you see security headed?

People come to the conference and then they spot those trends and answer the question for themselves [at the conference]. To answer the other part of your question — where is it going? — we've seen the integration of encryption and certificates. I think we've got a long way to go to make secure e-mail, for example, easier to use. [Secure] MIME is in both browser products, but it's a bit cumbersome.

I think what you'll see over the next year is the accelerating tight integration of encryption.

What do you see as RSA's mission now?

Our mission is to make sure that the most secure encryption technology that anybody knows about that's been published and scrutinized, is available to everybody who wants to use it in easy-to-integrate products. So essentially, [our goal is] to be the Dolby, so to speak, of the encryption business.

Product Reviews

► Software-metering tool

Express 2000 adds solid Y2K features

By Dennis Williams

SOFTWARE METERING offers network managers several major advantages. It can help pinpoint those applications that deserve the highest priority when it comes to load-balancing and applying updates; it can ease software license management; and it can help to determine a network's year-2000 compliance status. WRQ's Express 2000 Software Manager 4.0 addresses the immediate need for year-2000 certification, as well as the ongoing need for application management.

Express 2000 offers strong inventory and metering functions that will allow managers to inventory all hardware and software on the network and determine year-2000 compliance. But be careful: Express 2000's features may seem confusing at first, so the documentation should be followed closely to ensure an understanding of all the components.

Robust reports

The one feature I found that really makes Express 2000 stand out is its exceptional reporting capabilities; although all software metering applications offer reporting features, Express 2000's implementation is richer and easier to use, and creates more meaningful reports. Pre-configured reports allow you to select the information you want to generate. For example, you can indicate that you want a report of all unused applications and their locations, which will help you to determine whether to continue offering support for outdated applications.

The product's reporting capabilities will prove important to network administrators laboring to bring their networks into year-2000 compliance. Reports show you which are the most-used applications and which have the highest priority for year-2000 certification. And Express 2000 also generates reports suitable for upper management with graphics showing the progress made by the IT department.

Reports can be printed out or exported to Microsoft Word or Excel, or to HTML. A post-consolidation capability running as a Windows NT service will automatically export selected reports to HTML, so

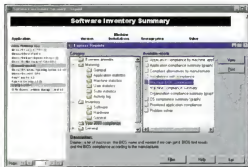
you can post daily updates on your intranet.

Easy to install

The Express Console is a Windows Explorer-like interface used to manage all aspects of Express 2000. It lets you organize workstations by groups, users, applications, and machines.

You will need at least one NT 4.0 server or workstation to maximize your use of the functionality of Express 2000, but either a Windows 95, Windows 98, or NT computer can be used for the administration console. Network clients can be any version of Windows, from 3.x to NT 4.0.

I installed the Express 2000 Enterprise Services on my NT 4.0 server, and I installed two Windows 98 test systems on the client. Setting up Express 2000 requires closely following the documentation, especially when preparing it for wide-spread deployment.



CREATING DETAILED REPORTS with Express 2000 is simple; many preconfigured reports are already included.

The client software can be loaded through a log-in script, which allows you, from the Express Console, to manage all machines on the network.

You can configure the inventory scanning to either low impact or high impact. By default, it is set to scan a client for 10 seconds, wait for 30 minutes, scan for another 10 seconds, and so on. Although it will take several days to complete the inventory, using these intervals will help reduce the impact on the net-

work and client.

I chose to have Express 2000 completely scan all of my test computers. It will take a few minutes to scan a 4GB drive, and less if it's only half-full. Once the inventory process is complete, you can start using the product's reporting tools, performing year-2000 tests, and metering your software.

Using Express 2000's software-metering capabilities, you can dis-

allow the use of applications that are not year-2000 compliant.

Additionally, if a user attempts to use an outdated application, the network manager can create a pop-up message that will point the user to a URL on the company intranet that will allow the user to download an upgrade, call the system administrator, or simply inform the user as to whether the application can be run. In this way, users may receive updates on the intranet rather than getting them from the Internet.

THE BOTTOM LINE



Express 2000 Software Manager 4.0

This software-metering tool offers a full, strong set of features, adding in year-2000 functionality.

- **Pros:** Access to extensive year-2000 knowledge base for compliance testing; preconfigured reports available for management or technical staff.
- **Cons:** Lacks year-2000 data-scanning capabilities.

► **WRQ Inc., Seattle:** (206) 217-7100;

www.wrq.com.

► **Price:** \$1,237.50 for 25 users.

► **Platforms:** Server: NetWare 3.x, 4.x; Windows NT 3.x, NT 4.0. Administration console: Windows 95, Windows 98, NT 4.0. Client: all Windows platforms.

When you select your configured applications, you can see their year-2000-compliance statement and add your own compliance notes to it.

► **WRQ page 42C**

► Network server

SBS brings integrated management to smaller shops

By Dennis Williams

MICROSOFT'S upcoming release of BackOffice Small Business Server (SBS) 4.5 is destined to turn the heads of both small businesses and technology providers. I tested the beta version and found it to be a solid, well-thought-out product that addresses the needs of small businesses. Not only does it contain all the powerful BackOffice server applications, but it also offers easy wizards to help make it easy for anyone to manage.

SBS is ideal for companies that are outgrowing their simple Windows 95 networks and need to implement a server. It was designed to offer a flexible, scalable growth path, and can be easily upgraded to the full BackOffice server while maintaining its unique SBS console, modem

sharing services, and fax services. You also can upgrade any of the individual services as needed.

Aiming to provide smaller companies with a networking platform that covers all of their business computing needs, SBS is based on Windows NT Server 4.0 and includes both Exchange Server 5.5 and Outlook 2000 for messaging; SQL Server 7.0 for database applications; and Proxy 2.0 for Internet access, as well as fax and modem sharing services. All of these applications are integrated, which makes them easy to manage and use, and they can all run on a single server.

SBS, Version 4.5, offers an increased concurrent user limit,



THE SBS CONSOLE offers easy-to-use wizards for performing day-to-day tasks.

from 25 users to 50 users, and an increased SQL database size limit, from 1GB to 10GB. An unlimited number of databases can be supported.

Also, a new dynamic memory management model has been implemented that allows all server applications to work together on the same server, so server-based applications do not have to run on

THE BOTTOM LINE

BackOffice Small Business Server 4.5, beta

SBS integrates its BackOffice server applications and services in a cohesive, easy-to-manage platform that provides a file server with database, e-mail, Internet, fax, and modem sharing services.

- **Pros:** Based on Windows NT 4.0 and BackOffice, easy to install and manage.
- **Cons:** 50 user limit; not for branch-office environments.

► **Microsoft Corp., Redmond, Wash.:** (425) 882-4000; www.microsoft.com.

► **Price:** Not yet announced.

► **Platform:** Intel Pentium 120 with a minimum 64MB of RAM.

► **Ship date:** Second quarter.

separate servers. The model allows memory to be dynamically allocated to applications that are undergoing heavy use from applications that are more dormant. This provides great integration between the two largest server applications that

► **SBS page 42C**



► Enterprise network modeling tool

Strategizer 2.1 adds little innovation to network simulation

By James R. Borck
To achieve cost-effective network ownership, network managers must proactively plan their network systems, and

there are many tools available to help accomplish this task. For example, Strategizer, Version 2.1, from Scientific and Engineering Software, is a network-modeling

tool that is designed to help network managers by prevalidating network designs. Strategizer works by modeling and analyzing the end-to-end interaction and performance

of client/server computing environments. It can model not only network hardware infrastructure, but also application and DBMS software, as well as user behavior. However, it lacks an auto-discovery feature to model existing topology, as well as a more comprehensive device library, and it cannot directly import network traffic data. In short, Strategizer is a solid simulation engine that requires far too much tweaking and elbow grease to be of great use.

Because Strategizer bills itself as an enterprise-wide modeling tool, its limited support and flawed ease of use disappointed me. For example, although this release of Strategizer supports topology importing via Extensible Markup Language, and although it can add support for Hewlett-Packard's OpenView and Tivoli NetView, in the absence of these

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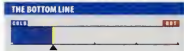
STRATEGIZER offers a limited device library and beta-version scenario management.

third-party solutions, you face the task of rebuilding your network from scratch.

Strategizer's device library is easy to use, but lacks sophistication. I was also disappointed to find that subnetwork layering, campuswide overviews, and drill-down inspections are also not supported, causing larger models to quickly become unwieldy.

Ultimately, this version of Strategizer, still a relative newcomer to the network-modeling market, seems to be more of an attempt to catch up with the marketplace than an effort to offer an innovative modeling alternative. Its good simulation performance and valuable data-mining capabilities cannot compensate for its lack of flexibility.

James R. Borck (james.borck@industrialart.com) is an IS director at Industrial Art & Science in Connecticut.



Strategizer, Version 2.1

This solid simulation engine offers a less-than-impressive feature set. The time invested by network managers to accurately model their network topologies will quickly escalate its true cost.

- **Pros:** Easily fine-tunes network parameters; easy-to-use diagramming; solid simulation engine.
- **Cons:** No real-time traffic importing; beta-only Experiment Manager; poor reporting; pricey.
- **Scientific and Engineering Software**, Austin, Texas: (800) 759-6333; www.ses.com.
- **Price:** \$19,999; service contract: \$3,990 per year.
- **Platform:** Windows NT 4.0 with Service Pack 3.

WRQ

Continued from page 42A

Comprehensive Y2K features

I was impressed with Express 2000's extensive knowledge base, a collection of compliance information about many business and popular applications. At the time of this review, there were 7,300 applications in the knowledge base, representing 1,200 vendors.

Express 2000's knowledge base makes it easy to determine the current compliance status of the applications available on your network. Furthermore, WRQ offers a dedicated staff of 16 full-time employees whose sole job is to research applications and create monthly updates. These updates are available to Express 2000 customers on the

company's Web site.

In addition, Express 2000 will test your hardware by performing the rollover and leap-year tests. But unlike some hardware-testing tools, Express 2000 will not provide patches for noncompliant BIOSes. This is because most BIOS manufacturers do not like the idea of a TSR fix because it isn't guaranteed or secure.

Instead, Express 2000 will direct you to the

URL of the BIOS manufacturer, allowing network administrators to download the official patch (if available) for the specific BIOS type and version. It is also important to realize that BIOS tests do not work on NT systems because NT protects the hardware with the Hardware Abstraction Layer.

The version of Express 2000 I tested offered no capability for data-file scanning. However, WRQ is now distributing Neo-

Media's Adapt PC2000 spreadsheet and database tool as part of the Express 2000 product for an added price of \$36 per seat. This makes it a well-rounded product for companies looking to integrate software metering and inventorying with a great year-2000 tool.

Dennis Williams (Dennis@ProductReviews.com) is a free-lance writer and product consultant in Alpine, Utah.

SBS

Continued from page 42A

most companies will be running — SQL Server and Exchange Server.

I installed the product on a Pentium Pro 200 with 64MB of RAM, which is probably the minimum level of hardware requirements you will want to use. But despite my limited hardware platform, SBS ran fine. More memory would have been required if I had implemented an SQL database, but the product performed well while running the Exchange, fax, and Proxy services.

The SBS Console makes it easy for administrators in smaller shops to handle simple daily tasks. The home page of the console displays a drive status so the administrator can tell at a glance whether drives are getting full. In addition, any error conditions are displayed here. For example, you will immediately notice if a critical service stops, such as your fax service.

The Console's Task page includes wizards for common administration tools. NetMeeting is used for remote administration so a technology provider can dial in to and take control of the remote administration server.

In addition, the Console isn't encumbered with flashy graphics or animation, so it works well via slow, remote links. And although those already familiar with Windows NT management will probably prefer to use NT's management tools, the SBS Console offers many wizards for common maintenance tasks.

For managers who are reluctant to implement a network for their small businesses, SBS is a great choice for making that migration easier. Because SBS is built on Windows NT 4.0, it is an ideal solution for those who are already comfortable with Windows 95. In addition, SBS makes it easy to connect networks to the Internet, to set up e-mail, to manage users, and to share files. If your company's network is composed of fewer than 50 clients, this is one product you should watch for.

Dennis Williams can be reached at Dennis@ProductReviews.com.

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For the latest in Internet commerce, visit the Focus on I-Commerce section on InfoWorld Electric at www.infoworld.com/ecommerce.

SHIPPING

OPEN MARKET today began shipping its LiveCommerce 2.0 system, a catalog-creation application for Internet commerce. The new version features real-time Dynamic Entry, which allows buyers to jump from anywhere on the Web to an appropriate item in a LiveCommerce catalog. Version 2.0 also provides new personalization capabilities, multiple-language support, enhanced search capabilities, and operates on the Sun Solaris platform. Open Market officials said. The product also sports enhanced connections to enterprise resource planning systems, according to the company. Open Market Inc.: www.openmarket.com.

ACTIVESTATE TOOL is delivering PerIDirect, a subscription-based tool that provides tools and test suites targeted toward corporate shops interested in using, but not managing, PerI.ActiveState will provide subscribers with regular releases of PerI and its popular extensions, incident-based support through the PerI Clinic (www.PerI.Clinic.com), a year-2000 test suite, and a weekly bulletin. Pricing for the program starts at \$12,000 annually. PerI.ActiveState Tool Corp.: www.activestate.com.

ANNOUNCED

LEVERAGE INFORMATION SYSTEMS, a San Francisco-based Internet engineering company, is giving away for free its Java-based enterprise Web application server. The source code for Leverage's previously commercial Locomotive server will be available this week at www.locomotive.org. Leverage will continue to provide Web design services. Leverage Information Systems Inc.: www.leverage.com.

TALK BACK

To contact Internet & I-Commerce section writers, send e-mails to firstname_lastname@infoworld.com.

INTRANETS & I-COMMERCE

Product Reviews page 47

Netscape boosts enterprise tools

Corporate portal gets rich data Enterprise Server upgraded

By Emily Fitzloff

WHILE ITS parent company finalizes details of a pending acquisition by America Online, Netscape's Netcenter division is forging business partnerships aimed at boosting Netscape's popularity in the corporate world.

Netscape currently is in discussions with business-intelligence provider SageMaker to integrate SageMaker's Information Management Program (IMP) with Custom Netcenter, Netscape's solution that

"You'll be able to say, 'Isn't it funny that this oil field off the coast of Mexico is 30 percent more popular than it was last week?'" White said.

"We have access to the kinds of business content that Netscape would die to get their hands on," White added.

Although Netscape did not wish to comment on the deal, White said the talks, although preliminary, have been positive.

At least one analyst familiar with SageMaker said this type of service would be of great interest to Netscape's business users.

"Delivering SageMaker's content-generating sources through Netcenter would be phenomenal," said Jim Bair, an analyst at the Gartner Group, in Stamford, Conn.

Although Bair said the long-term viability of this type of generating the knowledge map is just what Netscape needs to penetrate the enterprise market.

In other Netcenter partnership news, Netscape last week announced a deal with When.com to offer that company's free calendar solution through Netcenter. Netcenter's integrated communications service, according to Tom Tsao, group program manager of Netcenter Contact.

Netscape Calendar by When.com, slated for availability next month, will let users access secure personal calendar and scheduling information via the Internet.

"We chose When.com because of its compelling user interface, ease-of-use and its unmatched scalability," Tsao said.

The service also offers a feature that lets users automatically receive personalized event information. When.com has access to 500,000 event directories, according to Ted Barnett, president and CEO of When.com.

Netscape Communications Corp., in Mountain View, Calif., is at www.netscape.com. SageMaker Inc., in Fairfield, Conn., is at www.sagemaker.com. When.com, in Redwood City, Calif., is at www.when.com.

By Emily Fitzloff

NETSCAPE LAST WEEK announced the next major upgrade of its Enterprise Server, focusing on enhanced performance, reliability, and scalability.

In the area of reliability and availability, Netscape Enterprise Server 3.6 now includes support for multiple processes and process monitors, as well as automatic fail-over. If a Web application crashes, the Web site itself will not go offline, said John Dawes, director of marketing for Netscape's Web and application server products.

In addition, Enterprise Server 3.6 sports a dynamic feature that enables administrators to rotate server logs without shutting down the server, Dawes said.

Enterprise Server 3.6 also offers faster processing times, enhanced performance in serving dynamic content, and an increased ability to process heavy loads, according to the company.

For rapid access to Web content and applications, Netscape Enterprise Server 3.6 features enhanced access to Web applications written with the Netscape API and the CGI scripting language. The product includes a CGI engine to accelerate performance by as much as 1,500 percent, Dawes said.

For easier administration, Enterprise Server 3.6 includes a comprehensive set of Web server management tools, according to company officials.

The product comes bundled with Netscape Directory Server software to give administrators a single place to manage shared resources such as users and groups across the enterprise.

In addition, Netscape Enterprise Server 3.6 enables administrators to manage remote servers more easily by treating multiple servers as one cluster. Administrators can start or stop remote servers or update remote configuration files simultaneously rather than administering

each individual server.

Enterprise Server 3.6 offers support for standards-based remote monitoring capabilities from network-management systems, including Hewlett-Packard OpenView, Tivoli Enterprise Software, BMC Patrol, Computer Associates' UniCenter, and Sun Solstice.

One analyst said that Netscape is funding its energy into the right places with Enterprise Server 3.6.

"Scalability, robustness, and reliability are definitely what people

Market leader

According to the Gartner Group's October 1998 survey of Web server software used on Fortune 100 public Web sites, Netscape has emerged as a clear leader.



are looking for in Web servers," according to Dave Kelly, vice president of application strategies at the Hurwitz Group, in Framingham, Mass.

According to a recent survey by the Gartner Group, Netscape has indeed emerged as the clear leader in enterprise Web server capabilities. (See chart, above.)

However, the research report did predict that Netscape's Web server market share would go of its browser market share and begin to decline over time.

By the end of 2001, Gartner Group researchers predict that Netscape will be number one, but Microsoft will be a much closer second, trailed by IBM Domino in fourth place.

Netscape's Enterprise Server, Version 3.6, is available immediately for Microsoft Windows NT, Sun Solaris, HP-UX, IBM-AIX, and Digital Unix.

Pricing starts at \$1,295 for a 50-user license.

Netscape Communications Corp., in Mountain View, Calif., can be reached at www.netscape.com.

Drumbeat 2000 takes aim at the enterprise

By Jeff Walsh

ELEMENTAL SOFTWARE is targeting the enterprise with Drumbeat 2000, its latest visual Web application development tool.

The latest version of Drumbeat, which began shipping Jan. 18, adds wizards for linking

applications to back-end systems; enhanced support for server-side Component Object Model (COM) and Active Server Pages objects; VBScript support; and templates for common Web applications.

Drumbeat's DataForm Wizards automati-

cally display different user interfaces available to provide front ends for a database, without requiring any coding. Drumbeat 2000 also ships with prebuilt customizable application templates.

One Drumbeat 2000 beta user said the



DRUMBEAT 2000 enables Web developers to create dynamic data-driven applications.

Advertisement

"They're all pretty much the same."

T

hat is the way many IT managers view PCs, even servers. They all run Microsoft Windows®, they all seem Intel®-compatible. But look more closely and behold the differences.

Beyond the way PCs generally look and feel and perform, there are critical IT issues of serviceability, support, and overall vendor responsiveness. Added to that, of course, are price and overall value.

Take those factors into consideration and the real differences among the many PC and server brands begin to emerge. Next week in a four-page supplement in *InfoWorld*, you'll discover:

- > How a technology buyer for a public school system got maximum bang for his PC and server bucks, while obtaining optimal service, support, and performance of the machines.
- > Why a major PC integrator steers savvy clients away from the biggest brand names in PCs and instead toward an emerging build-to-order leader of Intel®-based systems.
- > A U.S. government specialist who saw his PC total cost of ownership drop while quality and vendor responsiveness shot up.

Be sure to look for "Yes, There Is A Difference" next week in *InfoWorld*.

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THE WEB HOTLIST

Web sites worth checking out

Fujitsu

www.fujitsu.com

Technology giant Fujitsu America supplies details about its products and support programs. Among the many technologies covered are flat-panel displays and fiber-optic communications.

Covad Communications

www.covad.com

High-speed communications company Covad Communications offers information about its services. Learn about the technology behind its TeleSpeed Digital Subscriber Line, or DSL, service, and find out where the service is available.

Matt's Script Archive

worldwidemart.com/scripts

College student Matthew Wright provides free downloads of CGI scripts. The Help Center contains scripting FAQs and information about the installation and configuration of scripts.

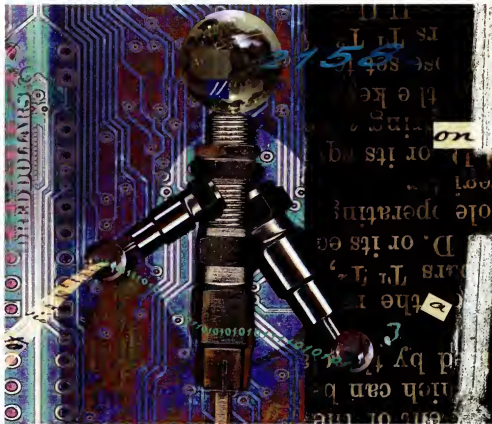
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SWITCHING HEADACHES

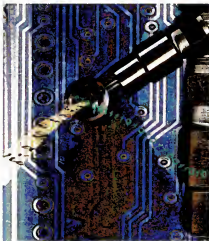
Bandwidth woes may be gone for now, but new management challenges have taken their place

NETWORK MANAGERS AND doctors often find themselves in a similar situation: The same treatment that saves a patient's life can produce side effects that cause a whole new round of trouble.

So it is with switching technology. The same technology that has successfully helped network managers overcome intra-workgroup and inter-subnet bandwidth bottlenecks has spawned a new set of management challenges. And many of those management issues are just now coming to the fore, as switching continues to penetrate corporate IT infrastructures to a greater and greater degree.

"New issues come along with switching as you try to figure out how you're going to monitor traffic now that every device has its own virtual segment," notes J. Kevin McLees, vice president for Bank of America's Strategic Technology Group at the company's Richmond, Va., office. "That affects how you do things like intrusion detection, too."

Philip Tee, chief technical officer at London-based Riversoft Ltd., which develops management software specifically designed for today's switched environments, points out another fundamental problem introduced by switches. "In the old days, you used to be able to use traceroute between any two machines in the world and see exactly which devices were between them," he explains. "But with switching, you now have devices that don't show up on a traceroute." As a result, failures in switches can ap-





"Everyone is going to have to get smarter about how they use bandwidth."

—Esmeralda Silva, IDC

pear to be failures in IP nodes when they're really not.

What's more, the introduction of switching has brought a new logical structure into the corporate network that spreads across the structure of IP addressing domains. That has hampered the ability of network managers to monitor service levels based on conventional department/subnet definitions. "Before, if you had a failure in subnet X and subnet X happened to be the trading subnet, you'd get really panicky, whereas if you got a failure in the payroll subnet, you wouldn't," says Tee. "But nowadays, that hard relationship between IP addresses and function has disappeared."

The growth of switching has therefore spawned a new generation of network management tools that help technicians cope with these challenges, enabling them to correlate device alarms in order to better pinpoint root causes, or to monitor service levels without depending on IP subnetting schemes. These new tools have become essential to coping with the primary side effect of any treatment that significantly increases network flexibility: added complexity.

LEVERAGING THE SWITCH

While struggling with the complexity associated with taming the switched environment, network managers must be careful not to lose sight of the enhanced flexibility and control it can provide. This flexibility and control manifest themselves in several areas, most notably virtual LANs (VLANs). Quality

of Service (QoS), and convergence.

VLANs are most commonly segment- or port-based, requiring network administrators to define manually VLAN associations that form broadcast domains based on organizational functions rather than accidents of physical location or IP address assignment. VLANs thus al-

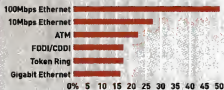
low network topologies to conform to the realities of how they're being used by the business, rather than how a network designer happened to have laid it out. Increased intelligence on switches and in network management software can also be used to help automatically define VLAN configurations across the enterprise. In fact, VLAN management software is now being used to maintain VLAN assignments even when a user's PC is physically moved to another location on the network.

QoS is perhaps an even more compelling potential benefit for the business. While VLANs control network traffic only in an undifferentiated way and only within a strictly defined set of users, QoS provides granular prioritization of the diverse applications that course across the entire enterprise environment. In fact, in some respects, what's taking place in the switching market can be viewed as an effort to bring some of the benefits of connection-based communications (such as ATM) to IP technology, which is connectionless. "Unless you have some sort of sense of a sustained connection, there's really no quality of service to maintain," says Tee. "So switching is absolutely essential to bringing QoS to IP."

Not everyone is moving forward with QoS implementation today, since network bandwidth, at least on the local and campus levels, is quite plentiful. However, as the mix of traffic on enterprise networks becomes more diverse, the importance of selective prioritization is becoming more apparent. "Larger companies are especially interested in ensuring that business-critical applications such as ERP get priority access," says Esmeralda Silva, senior analyst at International Data Corp. in Framingham, Mass. "And going forward, everyone is going to have to get smarter about

MAKING CONNECTIONS

Respondents asked to list their priority of technology for server LAN connections



SOURCE: INTERNATIONAL DATA CORP., IDC 300 SURVEY



how they use bandwidth."

Convergence is the main reason those smarts will have to increase. Most observers agree that, sooner or later, networks won't just be carrying a wide range of data applications; they'll also be running voice and multimedia content over those same links. That means QoS mechanisms will have to go beyond simply "tagging" packets for prioritization and actually provide reserved bandwidth and latency controls.

A MATTER OF POLICY

In fact, looking beyond today's limited QoS tools, vendors and users alike are beginning to consider the possibility of using an intelligent enterprise switching fabric to create a "policy-based" approach to managing QoS, as well as other aspects of running a network, such as security.

Under a policy-based management scheme, network administrators could define a wide range of prioritization rules based on such criteria as application, user, time of day, and other existing conditions in the computing environment. Thus, for example, the accounting department's access to corporate financials could be given the highest priority on the last few days of the quarter, while being relegated to somewhat lesser status the rest of the time. Executives could get high priority for all their applications, including Web browsing, which might generally be set at a lower priority for other employees. However, in order to achieve such granular controls, two things must happen:

1. The networking industry must develop standards for policy definition and enforcement that can be applied across heterogeneous multi-vendor computing environments.
2. Switches must gain the intelligence necessary to respond to such policy controls.

Hardware vendors are clearly feeling the pressure to bring the latter condition into existence. "The manufacturers realize that a lot of the value they're going to have to offer going forward is not going to be in the hardware, because ASICs are ASICs," Silva says. "No one is going to buy a

WHAT'S DRIVING NETWORK EQUIPMENT PURCHASES?

Respondents asked to rate the following applications as driving forces in equipment purchases in the next 12 months



SOURCE: INTERNATIONAL DATA CORP., IDC 900 SURVEY

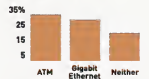
switch just because it can pass 23 million packets while another can only pass 22. More and more, vendors are going to have to differentiate themselves based on what the switch can do with all the new information that's available about the traffic on the network."

As for the former requirement, the development of policy-based management standards that can be applied to multi-level switching architectures, the action is clearly heating up. The Directory Enabled Networks initiative launched by Cisco and Microsoft back in September 1997 has now made its way into the standards mechanism of the Desktop Management Task Force. Consensus is building over how directories can be used as the repository of policy-related data and how policy consoles can utilize that data to define policy "leases" that can be provided to switching hardware when users request network services.

Networks are simply being asked to do way too much for things to remain as they are very long. Skyrocketing traffic volume, more diverse types of services, and an increase in how critical those services are to the corporate bottom line are driving switching to ever-increasing levels of sophistication. So it should be no surprise that network managers engaged in the intensive network therapies that are being used to treat the new condition of enterprise IT infrastructures wind up suffering a side effect or two ... including hair loss. x

CHOOSE YOUR SPEED DEMON

User preference for ATM versus Gigabit Ethernet



SOURCE: INTERNATIONAL DATA CORP., IDC 900 SURVEY



PUTTING GIGABIT ETHERNET SWITCHING TO THE TEST

By
Jeff
Kaplan

GIGABIT ETHERNET SWITCHING, like many emerging networking technologies, seems to have already become a mainstream product as a result of all the press and analyst attention of the past year or two. The reality is that this high-speed networking solution is still a 'bleeding edge' alternative that only a handful of organizations have adopted and many others still need to consider carefully before implementing. It is not because this form of networking is untested or unduly risky. Instead, organizations must make the more fundamental determination of whether it is the right networking solution to meet their business objectives.

SEPARATING HYPE FROM REALITY

The networking industry seems to feast on one technology fad after another, a ride that has taken us from ISDN to asynchronous transfer mode (ATM) to Gigabit Ethernet switching. The hype, driven primarily by vendor start-ups and industry pundits a year or two ago, is now promoted by the more established players and is gaining more widespread acceptance.

Gigabit Ethernet has emerged as an alternative to ATM for backbone upgrades because of its potential for lower capital and operating costs, along



with its relatively easy migration path from existing Ethernet environments. As a result of these perceived advantages and the success of early adopters, Yankee Group predicts Gigabit Ethernet will be deployed

in roughly 70% of corporate networks. Industry analysts also expect competitive pressure to increase, commoditization of switching products to occur, and port prices to continue to fall 40%-plus per year. Falling prices will make migrating to Ethernet Gigabit switching a 'no-brainer' for many organizations.

Despite all of the benefits of high-speed switching, however, the technology still leaves some things to be desired in today's changing network environment. Convergence of voice/data/video is still something that many talk about but few have successfully done. LAN/WAN integration and improved end-to-end quality of service are fundamentally still requirements to achieve seamless voice/data/video



convergence. It may be preferable to connect Gigabit Ethernet switches to an ATM backbone to support integrated voice/data/video, multiservice networks.

Another challenge is the growing array of new players and products that confuse buyers and delay upgrade decisions until new technologies and features are more proven. These conditions, along with delayed standardization, have already slowed the deployment of Gigabit Ethernet switches, according to Dataquest. Given these trends, network managers must carefully evaluate whether this technology is right for their organizations.

ASSESSING THE TECHNOLOGY FIT

To make this judgement, organizations must look at four key issues: Business requirements, network traffic, management infrastructure, and staff skills and resources.

The starting point for this must be a business assessment that determines how the complexion of corporate information will change over time. This assessment must examine origination and destination, volumes, time-of-day, and content patterns, and determine if information flow projections justify using high-speed Ethernet switching.

THROUGH A NETPRISM: MANAGING SWITCHES VIA THE WEB

Ask Bob Ellsworth what's at the top of most network managers' wish lists, and he'll tell you: control, control, control. "These guys need to be able run lots of remote sites without having a bunch of people all over the place," declares Ellsworth, the CEO of E-COOMS Inc. in Gig Harbor, Wash., which develops and distributes monitoring and control solutions for corporate and carrier POPs. "And you can't sell them a solution that locks them into a particular platform, because they've got enough issues there as it is."

These days, platform independence is pretty much

synonymous with the Web. But, as a relatively small developer, Ellsworth didn't have the time or the budget to engage in the process of building his own browser-interfaced switch management application. So he evaluated his OEM alternatives and settled on Fujitsu Software Corp.'s NetPrism application (www.netprism.com).

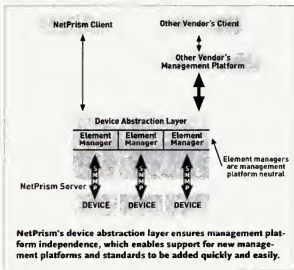
NetPrism is a Web-based network management solution that encompasses all the functionality of a full-fledged management platform, including SNMP element management, device state modeling, and a robust rules engine. Because NetPrism abstracts the particular

devices it manages, it can also snap on to any popular enterprise management platform already in place.

"The idea of writing code for each of the individual platforms our corporate customers are using scares the heck out of me," says Ellsworth. "NetPrism solves that problem for me very elegantly and effectively."

In addition to supporting OEMs such as E-COOMS, Fujitsu is providing workgroup and enterprise solutions to the corporate market, supporting popular switching hardware such as Cisco's Catalyst 5500.

"The richness of the NetPrism Java front end really beats anything else we looked at," says Ellsworth. "We definitely slashed several man-years off of our development process by going with Fujitsu."





While up-front Gigabit Ethernet switching costs may plummet, secondary costs may multiply.

The key network metrics for making a business case to adopt Gigabit Ethernet switching, or any other new networking technology, are: availability, response time, and quality of service. If adopting high-speed switches doesn't substantially improve network performance in one or more of these three areas, making the switch isn't worth the effort.

How do you make this determination? You can't demonstrate how new technology is going to improve business productivity without showing how current network performance affects existing productivity levels. Therefore, you must start by conducting a baseline study that documents current network performance levels, application response time

and process issues are of often more important than technology challenges. Fitting additional products into the overall management infrastructure requires additional staff skills and resources. Do you have the right people to plan and execute a high-speed switching rollout? Do you have the right help-desk policies and procedures to govern the day-

to-day administration of a switching environment? Do you have the right personnel to troubleshoot and proactively manage this type of environment?

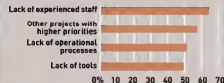
Few network professionals have developed in-depth expertise and extensive experience deploying Gigabit Ethernet switches and management products, because this technology is relatively new. Adopting this technology inevitably means turning to outside consultants, resellers, and integrators for help.

All of these considerations suggest an assortment of 'hidden costs' that must be anticipated in order to make a realistic business case for migrating to high-speed switching. While up-front switching costs may plummet, secondary adoption and management costs may multiply. Adopting a multi-tiered assessment model can help identify and quantify these costs.

These issues should not discourage organizations from carefully evaluating Gigabit Ethernet switching, or any other new network technology, for that matter. Business imperatives and competitive pressures may make this migration inevitable. However, adopting a regimented evaluation, planning, deployment, and management process will raise the odds that this migration will be successful, and as a result, your company's business will realize measurable benefits. x

Jeffrey M. Kaplan is director of strategic marketing for International Network Services (www.ins.com/surveys). He can be reached at Jeff_Kaplan@ins.com.

KEY BARRIERS TO IMPROVING NETWORK OPERATIONS



SOURCE: INS 1998

levels, and the direct business impact of these patterns. While comparative data from comparable organizations is often hard to find, this type of benchmark information can also be used to identify the gap between current and competitive performance levels.

Manageability is another key issue. Can your existing network management infrastructure and tools effectively monitor and manage new Gigabit Ethernet switches? In most cases, the answer is probably no. Without substantial system changes that enable new 'policy management' products to prioritize switched traffic, diagnosis bottlenecks, and optimize network performance, the existing infrastructure will be inadequate to get the most from your considerable investment.

It's important to remember that manageability is more than a technical issue. Survey research collected by International Network Services has found peo-

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HOTSEAT For Accrue Software CEO Richard Kreysar, Web analysis means business

Taking the measure of Web success

MOST COMPANIES do not have a good idea about what is happening on their Web sites. They may know how many people have visited their site, but they are sorely lacking for data on the demographics of those visitors. And without that kind of information, running a Web site is little more than an exercise in online marketing.

One company that is trying to make data captured by Web server analysis software into a business tool is Accrue. Richard Kreysar, CEO of Accrue, spoke with InfoWorld Executive News Editor Michael Vizard about the impact that data analysis tools will have on electronic commerce.

How does this type of software benefit business people, rather than just the Webmaster?

The analogy I go back to is that in the old days, you would receive point-of-sale information from cash registers or wherever you were

selling [the company's] products, and then make merchandising decisions.

Today, we have the Internet as our distribution channel, but we still have to make merchandising decisions. What our product does is provide the information that allows a product manager to make merchandising decisions on this new channel called e-commerce.

With the richness of the data we collect, you can not only make infrastructure decisions, you can make merchandising and business decisions.

Given the incredible number of data analysis tools available today, why would anyone need a special tool for analyzing Web server traffic?

There are really three pieces of the product, and [describing those pieces] will answer your question. One part of the product is the network collector. It sits in passive mode, out there on the wire, collecting all the clickstreams [data

about what links users are clicking on] that are going on. That collection of data is richer than what any log file will give you. For example, we provide data on resets. Why are those important to a business person? It tells how many people are hitting the 'stop' button, which means that either the content is boring or the graphics are too rich.

The second piece of the product is the data warehouse. And the third piece is code that sits above the warehouse, called the Analyzer. It allows you to stitch sessions together from complex Web sites. We can give you a session analysis across 30 servers, and where [customers came] from and where [they] went.

What's to stop the people who currently provide data analysis software from moving into this business?

We believe everything starts with the data. You've got to be collecting that rich data set to be able to branch out to all the rest. You can have a great report writer, but if it's garbage [you put] in, you get garbage out. I think you will see a huge consolidation in this market, because what the customer wants is

the complete solution.

The problem with most types of data analysis software is that it can only really confirm things that people either know, or suspect enough to ask questions about. How long will it take for software to mature to the point where it alerts people to trends they don't have any inkling about in the first place?

There are two things that need to happen. One is an improvement in the technology for modeling analysis. But there's also a nontechnology component. In the future, business schools are going to have to teach people how to interpret Web data. People who are responsible for merchandising are going to have to learn to interpret that data.

"In the future, business schools are going to have to teach people how to interpret Web data."

in conversations with providers of various OLAP [online analytical processing] tools. We're going to have an API that's documented for any third party, whether it be a cus-

tomers or another vendor, that people would be able to extract data from.

What else can we do with the data once we collect it?

What we want to do is apply certain business policies to automatically take action back on the e-commerce site. Because we track things like resets, we can say that if they exceed a certain percentage, then change the content. The next step is to apply business policy and take action.

What impact do you think this part-half-day session will have on e-commerce?

People are spending millions and millions of dollars on Web sites. Historically, people have been making a decision on how effective those Web sites are based on opinion. Now people want facts because they're spending millions of dollars on [e-commerce] and making millions of dollars off it.

How does that compare to where we are now?

I think we're in the early stages of people thinking about these things. I mean, if you look at it six months ago, what was the standard of success? The [measurement] of success was how many hits I had. Now we're talking about whether it is a new user that's hitting the site or a repeat user. And is that a hit, or is that a page, or is that a frame?

Those are the standardizations that need to happen, which are needed to measure the effectiveness of retaining customers, attracting new customers, and increasing sales.

Former advisers foresee possible Net regulations

■ Magaziner, Varney say pressure is on

By James Nicolai

WORLD GOVERNMENTS will rush to and legislate the Internet unless the computing and online-service industries step up their efforts to self-regulate matters of consumer protection, two former aides to President Clinton said last week at a San Francisco forum sponsored by the Internet Content Coalition.

"The next two to three years will be crucial in determining whether the Internet remains a free medium or whether it becomes an area that governments cannot resist regulating," said Ira Magaziner, a former Clinton adviser who helped shape the Clinton administration's current policies on the digital age.

Magaziner stepped down after five years in his White House position in December 1998 to become a business consultant.

The issue of who controls the Internet is a vital one for businesses and consumers, said Christine Varney, another former White House adviser who has also served as a federal trade commissioner. National laws governing taxation, import, and encryption can stifle the Internet economy, she explained.

Varney, who was also a speaker at the forum, is a partner at the law firm Hogan & Hartson and represents Netscape Communications in the ongoing U.S. Department of Justice-Microsoft antitrust trial.

Consumers need assurance that personal information submitted on the Web is not going to be used for

unscrupulous purposes, and they need to protect children from potentially harmful content on the Internet, Varney said.

Ironically, the success of the online retail business during the recent Christmas and New Year holidays may quicken the move to legislate the Internet, Varney said.

"I can guarantee that every American who bought something over Christmas and had never bought something on the Web before is going to get spammed," Varney said.

Meanwhile, other users may have

fallen victim to online fraud, Varney added.

Many of those users will write to their government representatives, who may then feel compelled to write legislation protecting their constituents, Varney said.

"If you walk away from the problem, you can be sure the government will impose the solution on you," Varney warned.

In order to protect information, third-party organizations must write a code of conduct and then provide certificates to Web sites that adhere to those codes, Magaziner said. Trust-e (www.truste.com) currently offers a similar service.

To protect minors from obscene

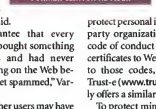
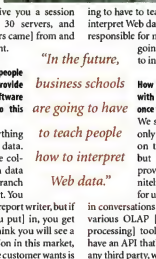
content, ISPs could offer multi-tiered service offerings so that users could choose to exclude certain content from entering their home, Magaziner said.

Empowering individual users rather than imposing nationwide laws also helps the Internet become a seamless, global network, he said. "Implementing consumer protection internationally is difficult because each country has a different sense of what consumer protection amounts to," Magaziner said.

But although third-party consumer protection initiatives like those proposed by Magaziner are already under way in the United States, Japan, and other countries, industry must move faster if it is to avoid government regulation, Varney said.

"I think you're going to see a lot of activity this year in Congress," Varney said.

James Nicolai is a San Francisco correspondent for the IDC News Service, an InfoWorld affiliate.



NET PROPHET · DYLAN TWENY

Market's love affair with Internet stocks won't end happily

WALL STREET'S INFATUATION with Internet stocks may be one of the century's great tragic love stories. This overplayed, extravagant, convoluted, and ultimately tragic tale of love will probably play out like the marriage of Prince Charles and Princess Diana. We're still in the early stages. The honey-

moon isn't over quite yet, despite some lovers' spats last fall when Internet stock prices dipped — momentarily — before shooting up again.

If anything, the stock markets have reaffirmed their love for anything with the word "Internet" connected to it. As I write



these words, the Nasdaq index, a bellwether of technology stocks, has just closed at record highs for the third day in a row. Amazon.com is trading at a record-high \$138 per share, meaning Wall Street thinks

the company is worth more than \$20 billion. Yahoo has topped \$290 per share. By the time you read this, the stocks no doubt will have moved significantly up, down, or perhaps in both directions several times in succession.

The example of Zapata shows just how frenzied things have become. Zapata, a fish oil and food packaging company, announced last spring that it was going to pursue an aggressive Web strategy, in effect buying its way into the Internet by acquiring high-traffic Web sites. Bingo: Zapata's stock shot up, from around \$6 per share to nearly \$25, despite the fact that Zapata had no experience with nets other than the kinds used to catch fish.

Zapata made plans to acquire 31 prominent Web sites. Then, in October's stock market retrenchment, Zapata's stock fell and it could no longer afford to make the purchases. It called off the agreements. Wall Street punished Zapata by kicking its stock back to its pre-Internet levels.

But in late December, Zapata announced that it was going to resurrect its Web site acquisition plans. Lo and behold, its stock doubled overnight and now hovers around \$12 per share.

If an economist were looking for a controlled study of the effects of adding the word "Internet" to a public company's business plans, Zapata would be it.

Anyone can see where this will end up. Even assuming that the stock markets in general will continue to be bullish (an optimistic assumption given mounting year-2000 anxiety), Internet companies' stock prices can't continue floating along in the stratosphere, unsupported by profits, assets, or proven business models.

Or can they? Individual investors aren't necessarily stupid to invest in the Internet. Far from it. Investing in the Internet today is no more irrational than playing blackjack in Vegas.

Even if you bought, say, Yahoo at what then seemed an extravagant \$200 per share, you could still have made money, provided you sold it at a higher price.

Wall Street analysts call this the "Greater Fool" strategy, because it doesn't matter how much of a fool you are when you buy a stock, as long as you can find a bigger fool who will buy it at a higher price. As Obi-Wan Kenobi said, who is the greater fool — the fool or the one who follows him?

Sooner or later, this period of infatuation is going to come to an end, and once again profits, market shares, and assets will determine Internet companies' stock prices.

When that happens, precious few of today's \$20 billion companies will still be worth that much in investors' eyes.

Do you foresee a happier ending? Write to me at dylan@infoworld.com.

Dylan Tweny has been covering the Internet since 1993. He is InfoWorld's Intranets & I-Commerce editor.

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FOCUS ON E-COMMERCE

■ Survey points to satisfied online shoppers

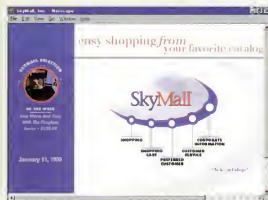
BizRate.com, an online customer satisfaction monitoring service, reported last week that online consumer holiday sales — transactions taking place between Nov. 26 and Jan. 3 — reached \$1.96 billion in 1998, according to its holiday online shopping survey of more than 33,000 online shoppers. The survey also reflected an increased comfort level for online buyers, with the more frequent online shopper (categorized as someone who had made more than five online purchases) spending almost 20 percent more than the average first-time online shopper. Once their holiday online shopping was complete, most buyers who participated in the survey rated their overall satisfaction levels as "quite satisfied," or four out of a possible five stars.

■ National e-commerce commission names chair

Virginia Governor Jim Gilmore will be named chairman of the new 19-member National Advisory Commission on Electronic Commerce, according to U.S. Representative Tom Bliley, member of the House Committee on Commerce and co-host for the upcoming Global Summit on Internet Policy in Fairfax, Va. According to Bliley, this action is good news for those who favor keeping the Internet a tax-free environment and don't want to see global expansion stifled by unnecessary bureaucracy, although no specific actions have been made toward that end by the committee yet.

The commission, formed as a result of the Internet Tax Freedom Act of 1998, is made up of federal, state, and local government officials and industry leaders from companies such as AT&T, Netscape, Time Warner, America Online, MCI WorldCom, UUNET, and Gateway. The panel will be studying federal, state, local, and international taxation and tariff possibilities for transactions conducted via the Internet. They are expected to report their findings to Congress by April 2000.

SITE PROFILE www.skymall.com



COMPANY SkyMall Inc., Phoenix
BUSINESS Online sales of catalog merchandise
REVENUES \$2.1 million for fiscal 1998 (projected)
TRAFFIC More than 15 million page views in December 1998; more than 28 million page views in the fourth quarter of 1998
TOOLS USED Microsoft Internet Information Server; Microsoft Windows NT operating system environment; Integrated Information System's Web-based Order Management System for order-entry, database management, accounting fulfillment, and other back-office functions; OrderTrust's order-processing network.
QUOTE Robert M. Worsley, president and chief executive officer

"We are committed to continuing to leverage our excellent customer service and back-end infrastructure to capitalize on the opportunities of the Internet. Without the size restriction of our paper catalog, we will continue to add additional content to our Web site, providing online consumers a superior shopping experience."

—Jim Bottery

► Web application server

Novera maximizes data

■ jBusiness 4 eases Web integration of diverse data sources

By Maggie Biggs

SUCCESSFULLY managing application components and their performance in distributed settings is of utmost importance for IT sites deploying Web applications. Novera Software's Novera jBusiness 4 rises to this challenge while also supporting component development and deployment.

Novera will be a strong contender in the ever-expanding Web application server marketplace. The InfoWorld Test Center recently analyzed the Web application server landscape. (See our Test Center Analysis, www.infoworld.com/printlinks.)

Novera jBusiness 4 meets rival SilverStream head on by providing support for session-level fail-over, which goes beyond server-level fail-over to promote better server availability. End-users working with applications that are protected by session-level fail-over will not lose data should a session failure occur. This kind of protection is ideal for Web commerce applications. (See our review of SilverStream, www.infoworld.com/printlinks.)

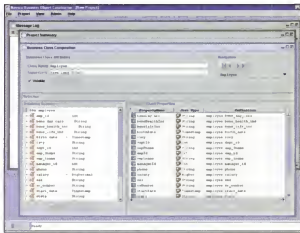
In addition, this jBusiness update offers heightened competition for Oracle, Netscape, and IBM by offering native support for CORBA as well as Enterprise JavaBeans. Support for JavaBeans varies by competitor.

Improved management

This version of jBusiness comprises three major components: the application server, the management server, and a component development environment. This version also features a completely rewritten management console interface.

The new console interface gives administrators multiple views of deployed components. Administrators can also use the interface to closely control access to the management operations. IT sites using system management tools, such as HP's Openview, can integrate jBusiness with these tools for greater manageability.

Overall, I found navigation and usability of the new interface to be a welcome improvement from earlier versions. I also liked the fact that Novera includes APIs for the interface, so IT departments will be



THE BUSINESS OBJECT CONSTRUCTOR lets developers integrate data from legacy, enterprise resource planning, and relational data sources.

able to customize it.

Object construction

Also notable in this release is a new component development tool called Business Object Constructor. Developers will find this tool useful for viewing data from multiple sources, such as relational data, legacy systems, and enterprise resource planning applications.

Using the Business Object Constructor, I was able to select the data I needed for my test applications. The tools enabled me to build data relationships and provided the functions required to manipulate the data. Once my data requirements were defined, the Business Object Constructor automatically generated the Java classes and mapped the object to my various data sources.

Developers will need to use an external application development tool, however, to build the business logic for the objects created with the Business Object Constructor. Novera could add some value by including built-in support for business-logic creation in a future release.

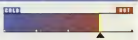
Novera has upped the ante for rival Web application server solutions by adding support for both CORBA and Enterprise JavaBeans in jBusiness 4. Others, such as Oracle's Application Server and SilverStream have implemented this support, or are working on adding it. Plus, jBusiness also supports the Component Object Model.

Novera jBusiness 4 has a lot to

offer for the price. As a Web application server, jBusiness 4 holds good value; its appeal is bolstered by solid management, development, and run-time capabilities. IT sites considering Web application servers solutions would be well-advised to investigate jBusiness 4.

Senior Analyst Maggie Biggs (maggie_biggs@infoworld.com) evaluates application development and database technologies at the InfoWorld Test Center.

THE BOTTOM LINE



Novera jBusiness 4

This Java-based Web application server will be a strong contender due to its promotion of information reuse and support for object models.

- **Pros:** Solid graphical tool simplifies integration of data from diverse sources; supports automatic Java class generation for business objects; maps objects to data sources.
- **Cons:** Lacks built-in tools for business-logic creation.
- **Novera Software Inc.**, Burlington, Mass.; (888) 668-3721 (toll-free); www.novera.com.
- **Price:** \$3,495 per developer; \$9,995 per server processor.
- **Platforms:** Server: Solaris, HP-UX, Windows NT; Clients: Windows 95, Windows 98.

As with every new piece of enterprise technology, someone has to try it first.



Microsoft

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To see who else is deploying Microsoft SQL Server 7.0 in their enterprise go to www.microsoft.com/sql/



► Web site analysis software

WebTrends strengthens feature-complete suite

By Andre Kvitka

DEVELOPING A WEB site and not knowing anything about its visitors is like spear-fishing blindfolded. Fortunately, applications such as WebTrends Enterprise Suite, Marketwave Hit List, and net.Genesis' net.Analysis do a nice job helping Webmasters translate Web site log files into useful information, but don't extend past the basics.

This latest version of WebTrends Enterprise Suite continues to expand its horizons. The suite is primarily a log file analyzer, but WebTrends has enhanced a number of other useful modules, or cartridges, that extend the reach of this suite. The Proxy Server Analysis cartridge helps track usage trends on

the site; the Link Analysis cartridge examines the links on your site and checks their integrity; and the Alerting and Monitoring cartridge monitors any IP device. WebTrends Enterprise Suite offers a comprehensive toolbox for Webmasters.

Improved analysis

The Log Analyzer recognizes more than 30 Web server log formats. Key features I found useful were the ease with which I could set up a Web site profile, set up filters, and configure other custom options. WebTrends' unique FastTrends Database stores downloaded log data for later use. Log Analyzer simply adds new data to the existing database — cutting back on reporting time. I could also have the Log Analyzer look up data



WEBTRENDS' SITE MANAGER gives users a variety of site views, including hyperbolic.

from an external database.

The advantage of using FastTrends vs. an external database is its speedy performance and use of real-time analysis and reporting. This version features expandable and collapsible report tables and the capability to separate report sections into individual report files.

The Proxy Analysis cartridge also received a slight face-lift. Real-time analysis has been added, as well as support for various proxy servers.

Added management

Building on the somewhat generic Link Analysis cartridge, WebTrends

has dramatically improved with the addition of Site Manager, which, through visual tools, gives you a better understanding of the site's structure and layout. Once a link analysis has been completed, I turned to the Site Manager to view my site by file type, link type, graphical Web chart, hyperbolic tree, or group view.

Another helpful addition is seven different Web data views. There is an internal browser view, parent pages, internal links, and more. Expanding the Link Analysis cartridge are filtering options that helped focus the scope of my analysis by excluding URLs, file types, or images.

A key component is the Monitoring, Alerting, and Recovery cartridge. WebTrends pings a device and reports on three levels of alarm: green, yellow, and red.

WebTrends is strengthened by its component approach. Cartridges can be added as needed, making WebTrends Enterprise a great choice

THE BOTTOM LINE

WebTrends Enterprise Suite 3.0

This suite is a must-have for any organization wishing to gain insight into who is using its Web sites and how.

- **Pros:** Easy to use; many filters to help customize final results; program modularity allows the addition of other components as needed.
- **Cons:** Server limited to Windows OS.

■ **WebTrends Corp.,** Portland, Ore., (503) 294-7025; fax: (503) 294-7130; www.webtrends.com.
 ■ **Price:** \$1,499
 ■ **Platforms:** Windows 95, Windows 98, Windows NT.

for organizations that want comprehensive site information and reporting capabilities.

Technology Analyst Andre Kvitka (andre_kvitka@infoworld.com) reviews Web site development and analysis tools.

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**INFO
WORLD**

► Web project management

Mesa/Vista helps Web-based teams work

By James R. Borck

WITH DIVERSE staffing options and distributed team development becoming the de facto standard, it's more difficult than ever to track projects and manage workflow. Mesa Systems Guild's Mesa/Vista Enterprise 3.0 provides a complete process-management clearinghouse for project and resource data. Designed for enterprise use, its Web-based tools for collaboration and communication integrate with your Web server to provide a tightly knit working environment for team development.

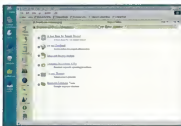
I found this version of Mesa/Vista offered a more refined interface than previous versions. The frames-based, icon-driven layout is easy to understand and provides quick navigation between data sources. Initiating and

tegration with third-party development applications such as Rational Rose. I was able to traverse easily between data in Mesa/Vista and its corresponding modeling diagrams.

Mesa/Vista offers very effective version control and can add any type of document to a project for tracking. Plus, Mesa/Vista's newly added search engine allows for fast lookup and drill-down navigation of project materials. Version 3.0 adds support for user administration via Lightweight Directory Access Protocol (LDAP), and an LDAP server is included. A useful extra is the capability for individual users to customize their viewing preferences.

Its simplicity of administration and ease of use make Mesa/Vista very appealing. Its comprehensive features provide an edge in effectively managing projects, especially when compared to less extensive packages such as Netosphere's ActionPlan.

James R. Borck (james.borck@industrialart.com) is an IS director at Industrial Art & Science, in Connecticut.



A PROJECT MANAGEMENT OVERVIEW gives all members access to the development cycle.

updating projects was the easiest of any management package I have tried, including less complicated packages such as Instinctive Technology's eRoom.

The key addition to this version is the capability and ease with which Mesa/Vista can link disparate data sources. Teams can create and store project materials in one repository, then easily check them out via a Web browser. This version uses Java applets to allow access to underlying data without requiring that the native application reside locally.

I was impressed by Mesa/Vista's vertical in-

THE BOTTOM LINE



Mesa/Vista Enterprise 3.0

This upgrade provides a solid solution for managing Web-based projects via a unique plug-in approach.

- **Pros:** Easy to install, configure, and administer; added search tool; improved linking; low price.
- **Cons:** No direct support for budgeting or estimation; cannot copy between projects.

► **Mesa Systems Guild Inc.,** Warwick, R.I. (888) 637-2797 (toll-free); info@mesasystems.com; www.mesasystems.com.

► **Price:** \$10,000 for enterprise core; \$500 to \$7,500 for plug-ins (for Rational Rose).

► **Platforms:** Servers: HP-UX, Solaris, Red Hat Linux, Digital Unix for Alpha, Windows NT; Web servers: Netscape, Apache, Microsoft Internet Information Server.

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What were the real trends of 1998?

These edited excerpts from InfoWorld Electric's forums provide a sample of the lively debate that takes place there. For the full discussions, go to www.infoworld.com and click on the forums button.

A look back

"1998 will be [seen as] the year when every ISV realized what Microsoft actually meant when it articulated 'Windows everywhere'—not a single market for any ISV that Microsoft sees as potentially threatening or profitable."

"Business software stagnates. New versions of office software offer little real innovation and the terms 'downgrade' and 'upgrade' define the technology logic. The number of different versions of software in common use increases, complicating software design and support."

"A revolution is taking place. Billions of dollars are powerless against the free flow of source code. People are finding a better world where profits and money are not the driving force."

Frayed at the end

"I've been a victim of burnout [despite] rewards such as pay raises, department recognition, letters of praise from co-workers, and various other methods. Burnout is (for me, at least) a condition in which the desire to continue in a job or project is nearly or completely gone, due mostly to the inability to get a break from a

fast-paced environment."

"New subject matter for learning appears much more frequently than it used to. And it isn't trivial stuff either. You can invest your personal time for six months only to find that things have changed again. But why not just disregard what is going on and wait for the dust to settle? The problem is that my clients seem much more prepared to consider and embrace new ideas... and they do it much more quickly than they used to."

Assessing the Microsoft-BDJ trial

"Who will win? Microsoft may beat the rap, but it can't beat the process. Its PR is listing and taking on water. The powder's wet for its biggest guns just as new threats seem to be popping up everywhere: Java, NCs, Linux, Jini, total cost of ownership, Raw Iron, Y2K, NetWare 5, and a host of others. It will be stretched way too thin."

"I don't think that any reasonable person wants Microsoft to 'go away' or to be unfairly treated, but it is in all of our interests for the Department of Justice to do its job and prevent unfair business practices. A breakup might actually help Microsoft in the long run."

"There's been a lot of talk about the AOL-NetScaped deal. Admittedly, their timing was awesomely stupid, from the standpoint of helping Microsoft's legal case, but it really won't have much effect in the real world. Internet access is just too far downstream."



TO THE EDITOR

The AS/400 is in the race

I AM A NETWORK ANALYST at a midsize company that has chosen to stay with our AS/400 platform and add Windows NT boxes to off-load tasks. [See From the Editor in Chief, Dec. 28/Jan. 4, page 47.] Ten years ago, our AS/400s were the IT department. Now, the proliferation of PCs and the emergence of our corporate LAN/WAN in addition to the public Internet have complicated the picture. We kept the AS/400 for many of the same reasons that we bought it: stability, scalability, and the ability to find competent programmers and support personnel.

NT is making inroads in areas in which we use specialized applications more suited to NT or network infrastructure, such as DHCP [Dynamic Host Configuration Protocol]. NT works well for applications that don't need around-the-clock availability. Our core business systems need more stability.

Although IBM has done an impressive job enhancing the AS/400 to meet the needs of the shop that wants to do everything in the same box, we see the role of the AS/400 changing to one in which it can devote all of its resources to being the rock-solid OLTP [online transaction processing] and core business application server that it has been for years.

Patrick Payne
Chicago

IN RESPONSE TO Sandy Reed's column about the AS/400, I have been working in the IS world since 1969, and after having experienced the AS/400, it is very difficult to not be

an AS/400 bigot.

Oh, sure, other platforms do letters, spreadsheets, and pretty pictures better than the AS/400, and we all need these things. However, our business and many others do not live or die by these niceties. Obviously, our world has room for many different computer operating systems and hardware plat-

forms, and, obviously, our world will not have a "standard" operating system anytime soon.

It is amazing to me that anyone would predict the demise of the AS/400. They have apparently been reading the trade press rather than talking to actual AS/400 users. I'm not convinced that any other platform can come

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"I thought you might like to know that the complete text of our divorce settlement is now available on the Internet."

close to competing with the AS/400 when all things are considered: reliability, performance, total cost of ownership, operation, scalability, etc.

So how do I vote? The AS/400 is not gasping for air nor is it just getting its second wind. It is simply continuing to improve and be the finest business computer the planet has ever seen.

Don McElroy
Durand, Wis.

How much are we really paid?

I REALLY ENJOYED Bob Lewis' "Easter Eggs" column. [See IS Survival Guide, Dec. 21, page 73.] I really liked the point about working for a standard of living.

That's the real shocker. InfoWorld is an IT magazine; a majority of its users have probably switched jobs once or twice just for a higher salary or more perks. I've been scoffed at by IT professionals countless times when I passed up more money in consulting jobs because I enjoy working with the people at my office.

These same money hounds who leave employers at the drop of a hat for a signing bonus and a \$1,000 raise are the ones shouting at the top of their lungs about the open-source movement and freedom of information. I couldn't put my finger on what really bothered me about it all until I read "I'm paid a standard of living." It's a nice answer to the ominous question I get at parties a lot now: "And how much do you make?" I make enough to keep me happy.

Jason Beatty
jbeatty@macnax.com

I WOULD LIKE TO THANK Bob Lewis for two things. The first is the paradigm shift caused by his recasting my compensation from dollar-based to lifestyle-based. He was "on the money" and the thought that I am paid a lifestyle pleases me.

The second is that as the father of a 16-month-old daughter who never ceases to amaze her mother and me, I look forward with much anticipation to her next "Easter Egg."

Gerry Anderson
ganders@aimmax.com

Where not to put all your eggs

IN RESPONSE TO the article on why Microsoft and Intel are drifting apart—this is news? [See "Marriage on the rocks?" Dec. 28/Jan. 4, page 1.]

History shows that Microsoft is an extremely unpredictable partner, not the kind of company you'd want to trust with the future of your company. It's understandable that Intel doesn't want all its eggs in one basket. We're starting to see that with a few other companies in the industry now. If someone is making high-end software, chances are they're going to want to run on more than just Microsoft platforms.

Bruce Ide
Greyfox@supremo.cspot.com

PDA's improve productivity

I WORK IN IT and am also a big PDA [personal digital assistant] fan. I didn't get a PDA to bug my boss; I got it so I could deliver more value to her. [See From the News Desk, Dec. 21, page 5.] Even if PDAs are a pain for IT, they make people significantly more productive and reliable. I believe it is in an organiza-

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ERP & SERVICES BRIEFS

■ Y2K glitches at a site near you

More than one half of U.S. corporations and government agencies have already experienced a year-2000-related computer error, according to the most recent quarterly survey of year-2000 issues by the Cap Gemini Group, in New York. The survey of IT directors and managers at 110 major U.S. corporations and federal, state, and local government agencies also showed that every participating organization is currently in the process of developing contingency plans to prepare for expected failures. Last April only 3 percent were developing such plans.

The survey results reflected an intensified focus on the year-2000 problem in U.S. corporations. For example, the percentage of companies that planned to conduct a code audit, an intermediate step before the testing phase, rose from 16 percent in the last quarterly survey to 62 percent in the current survey.

■ EDS wins huge Connecticut deal

The National Football League's New England Patriots, which is relocating to Hartford, Conn., is not the only one finding gold in the rolling hills of Connecticut these days. Professional services giant EDS has tapped into a massive privatization project, through which the Nutmeg State will outsource its entire base of IT operations.

EDS was selected, contingent on contract negotiations, to head Connecticut's IT activities, from desktop to mainframe system operations, telecommunications, applications development, and systems integration services, EDS said.

To land the seven-year, \$1 billion outsourcing project, EDS partnered with Xerox, Unisys, A.T. Kearney, Microsoft, Lucent, Sprint, and AMS, among others.

■ IMI buys into customer service

Swedish supply-chain vendor IMI Industri-Matematik International) is expanding its functions by buying Abalon sales and customer service software from its former owner, Astec International. The \$9.5 million purchase, announced Jan. 4, will become effective in the third fiscal quarter of 1999, IMI officials said. IMI will take on all 80 Abalon employees, including its three founders. Astec officials said they sold off Abalon's sales, marketing, and call-center applications to let Astec focus more on its own customer service applications such as Service Alliance and Dispatch-1.

FEATURE

Preparing for Win2000



Although the release of Windows 2000 is a moving target, companies can already see it in their sights. See page 55

Pushing corporate automation

■ Smaller vendors find niches complementing ERP in administration

By Stannie Holt

ENTERPRISE RESOURCE planning, or ERP, has expanded beyond manufacturing to include distribution, finances, human resources, sales, and customer service. But even the biggest ERP suites don't yet automate all of the functions that keep the corporate wheels spinning.

Now springing up in the spaces between the long-standing software categories are new classes of applications that offer solutions for mundane but pressing corporate problems such as ordering office supplies, tracking sales commissions, recruiting for hard-to-fill jobs, and keeping the truck fleet maintained.

Although they may have little else in common, these ERP-enhancer applications (or "corporate grout," as one observer calls them) all promise big paybacks by cutting corporate costs through less paperwork, lower supply prices, and better advanced planning for smoother operations all around.

"The growth prospects [for these applications] are tremendous — in the 60 to 100 percent range," because companies are finding them so useful, according to John Hagerity, research director for enterprise applications strategies at AMR Research, in Boston.

One popular function is workforce planning — not just recruitment and résumé shuffling but analyzing which skills are most needed, Hagerity said. MRO (maintenance, repair, and operations) is a broad category that covers everything from issuing reminders to have the company trucks' oil changed to keeping the office supplies cabinet stocked. Online procurement, often with automatic price comparisons, can also be included in this category. Other special applications track types of expenses such as travel or sales commissions.

Several trends are fueling this software evolution. Many companies are now looking for ways to get more value out of the ERP packages they implemented during the client/server boom in the mid-1990s. As the economy matures, enterprises are shifting their IT emphasis from increasing profits — e.g., through manufacturing and sales applications — to cutting costs, according to Lisa Tomlinson Williams, an analyst for enterprise applications at the Yankee Group, in Boston.

One might think that ERP giants such as SAP, Oracle, and PeopleSoft would already have discovered and dominated the market for internal operations. In fact, the big vendors are starting to offer functions

Filling in the cracks

Many new applications, which supplement existing ERP systems, are springing up to automate internal corporate processes. Here is a sampling of the major players in various categories, some of which overlap.

Expense reporting: Concur Technologies, Extensity, and Captiva (and many financial packages)
Office supplies procurement: Concur, Arbica, and Commerce One (and many electronic-commerce packages)
Sales commission accounting: Callidus and Trilogy (and other sales-force automation packages)
Recruitment/staff deployment: iCarian, Skillset, Resumix, and Retrac (and human resources packages)
General analysis, decision support: APS, Pilot, and Arbor
Fleet management: Prototype and Control Software
Coordination of employee information: Orbis and Concur

such as procurement or self-service human resources updates. And Trilogy and other front-office vendors track sales commissions.

In the long run, Hagerity foresees a shakeout in the market for these ERP-

enhancer applications. But the smaller vendors tout greater ease of use for customized, lightweight applications.

Some of these applications are starting to converge in corporate Web portals.

"We offer one-stop shopping to corporations," said Mike Hilton, chairman and CTO of Concur Technologies, in Redmond, Wash., which offers online procurement and travel and entertainment expense tracking. Currently separate products, in the next generation they will be integrated in a portal-like Web environment, called Employee Desktop Suite, due out in March, he said.

Internal operations is such a diverse field that it may not be worth the ERP giants' time to develop separate applications for, say, truck fleet maintenance, tracking lawyers' billable hours, and so forth, Williams said.

"With every company, there's a different cost center," Williams said. "There's going to continue to be room [in the market] for all of these different applications."

CA sketches services blueprint but lacks complete foundation

By Ted Smalley Bowen

WHILE Computer Associates scans the market for acquisitions to push its services business into the first tier, the company continues to draft ambitious plans to transform itself into a product company that can credibly offer vendor-neutral services.

Despite the \$4.7 billion company's significant war chest, the missing ingredient — a large, established services company on which to base the network and systems management software giant. Potential targets include Cambridge Technology Partners, Technology Solutions, Diamond Technology Partners, and SHL Systems House, according to industry observers.

CA in April 1998 launched its Global Professional Services (GPS) division, which faces the task of consolidating the company's internal services resources with the various acquisitions designed to meet its lofty professional services goals.

However, the company still has a long way to go. According to CA officials, services accounted for only about 5 percent of the company's \$1.2 billion revenue for

CA's professional services strategy

Consulting: assemble 100-plus person business assessment and consulting group from CA staff; use advanced CA technology for consulting engagements

Technical services: provide development and integration, including focus on integration of existing systems, partnerships for supply-chain management, and electronic business

Educational services: use artificial intelligence and 3-D technology to branch out from CA product training to multi-vendor product training and broader training offerings, including non-IT

Outsourcing: offer services through CA and/or partners

SOURCE: COMPUTER ASSOCIATES INTERNATIONAL INC.

the fiscal quarter, ended Sept. 30, 1998.

To raise that percentage, CA needs to overcome its reputation for placing its own products first, according to analysts.

"They might wind up being agnostic, but it's the market-perception issue — and they would have to work really hard to convince customers," said Siew-Joo Tan, an analyst at International Data Corp. (IDC), a market research company in Framingham, Mass.

This year, GPS plans to focus on consulting, technical services, educational services, and outsourcing, according to Suzanne Cassiello, director of GPS marketing at CA.

Getting its advanced guard in order, the

▶ CA page 56

Firm pitches secure integration CA

By Ted Smalley Brown

SEEKING TO CAPITALIZE on the need to secure the hybrid systems resulting from enterprise application integration projects, systems integrator Concept Five Technologies this week will roll out its Secure Application Integration Methodology (SAIM).

The methodology, along with Concept Five CORBA-based security software, provides a reusable template for securely tying legacy systems to newer applications and opening business systems to the Internet, company officials said.

The SAIM methodology includes standardized application interfaces, tools, and reusable middleware, according to the officials.

Concept Five addresses application integration from a high level, supporting a wide range of component architectures, messaging, platforms, packaged applications, and legacy systems, according to Peter Privatner, Concept Five's senior vice president of marketing and corpo-

CONCEPT FIVE STATS

Founded 1996, spin-off of Mitre Corp.
Employees 150, about two-thirds systems engineers

Other Info Bought Mitre's controlling interest in spring 1998 for \$25 million
Target markets include financial, manufacturing, and pharmaceutical industries

Contact Information
Concept Five Technologies Inc.
McLean, Va.
www.concept5.com

rate strategy.

"Our approach is to create an integration bus, a reusable middleware framework for integrating legacy systems with Web and front-end applications, as opposed to the usual systems integration approach of a one-off project with a lot of custom code," Privatner said.

Because 90 percent to 95 percent of enterprise application integration projects involve the opening of back-end systems to the Internet, security that crosses platforms and component models is critical, Pri-

vateer noted.

SAIM outlines a staged approach, covering business and technical strategies; technical infrastructure and middleware; application architecture; component design; and component development, integration, and deployment, according to Concept officials.

The spin-off of company of government systems integrator Mitre has developed software conforming to the CORBA 2 security standard, for battening heterogeneous distributed systems, Privatner said.

Concept Five originally developed its security software and tool kit under contract with Hitachi. The company has since licensed it to Iona Technologies and is pursuing other OEM deals, according to Privatner.

"We want enterprise application integration vendors to eventually consolidate their functions and in-house security. And if it turns out to be our security technology, we'll be well prepared for that," Privatner said.

Continued from page 55

company is beefing up its recently formed business assessment and consulting (BAC) group, which is headed by the company's senior vice president and general manager, Ajit Maitra.

The BAC group will apply some of the artificial intelligence monitoring and 3-D visualization technologies of CA's flagship TNG Uniter systems management product to the task of assessing an overall business, Maitra said. He stressed that the group will avoid steering customers exclusively toward CA products in its technical recommendations.

Based on the BAC group assessment, customers will be advised to "build a CA product or technically agnostic product," Cassiello said.

Maintenance and outsourcing will be handled by CA or one of its service partners, according to Cassiello, who said CA is close to announcing deals with established players in those areas, but declined to specify what those deals may be.

Separately, the company's GPS education group will also make extensive use of CA's artificial intelligence and 3-D visualization software, according to Terry Seppala, senior vice president and general manager for education services.

After the failure of its \$9.8-billion takeover bid for Computer Sciences in early 1998, CA made a series of smaller acquisitions, buying up the likes of Reallogic, LDA Systems, and Aventura Systems during the course of the year.

Reallogic brings a solid, if relatively small base of integration and consulting services, and LDA and Aventura bring midrange systems and electronic commerce/electronic data interchange expertise, respectively.

"[However,] Reallogic is not big enough to be the whole services group, and CA has made little effort to [grow one] organically," said IDC's Tan.

In order to reach its ambitious services goals, CA needs to keep thinking big on the acquisition front, according to Tan.

Computer Associates International Inc., in Islandia, N.Y., can be reached at www.cai.com.

Remote access lets Cheesecake Factory expand

By Jessica Davis

WHEN CHEESECAKE and other culinary delights are your major focus in life, you probably don't spend too much time sweating over what elements should make up your IT infrastructure.

However, that's just what the fast-growing Cheesecake Factory needed to do to fulfill its plans to expand its chain of 28 restaurants by 30 percent per year for the next five years, says Charles Morin, manager of corporate IS at the company, based in Calabasas Hills, Calif.

The Cheesecake Factory first began to look at upgrading its computer systems in 1997, the year its revenues swelled to a hefty \$189 million, up from \$140 million in 1996. With 23 restaurants in 1997, the company's system for moving sales, inventory, and other information from the restaurants over phone lines to the company's headquarters was possible via PC Anywhere remote-access software, which the company used.

"Then we moved to a polling system using scripting within PC Anywhere to automate the process," Morin says. "That new system would pull files across quickly, but it worked only 75 percent of the time. The rest of the time we had to go grab the files manually."

The system of manually grabbing files worked in a company with 23 remote offices.

However, if the Cheesecake Factory fulfilled its goal and grew to 100 or more restaurants, manually grabbing the files from each restaurant once or twice per day would prove impossible. The company needed to find a new way to move information from its many field offices to the headquarters every day.

As a result, an upgrade project began in October 1997, with the goal to automate the procedure of moving data from the restaurants to the company's headquarters. The Cheesecake Factory also wanted to be able to manipulate the data gathered from its restaurants and eventually add its first data-warehousing system and the capability to perform decision support, according to Morin.

As before, the PC at each restaurant now functions as a translator for the data in the POS station. When the machine at the company's headquarters polls a restaurant, it collects data about sales, inventory, and other restaurant information, such as labor costs, from the PC. That information then goes into a Microsoft SQL Server running Windows NT 4.0 on a Compaq ProLiant box at



A MORE OPEN AND POWERFUL remote-access operation allowed the Cheesecake Factory to hit its growth goals.

the corporate headquarters.

Currently, data still travels over standard dial-up phone lines. However, the company is looking into adding ISDN or frame relay to each restaurant to speed up remote access.

Instead of continuing to use PC Anywhere remote-access software, the Cheesecake Factory has moved to Sterling Commerce's Connect:Remote, which polls restaurants three times per day for e-mail and twice per day for sales information. Connect:Remote can also provide automated software distribution and includes version-

control features.

"It lets us launch processes on either side before or after the connection occurs," Morin says.

During the course of the upgrades at the restaurants, at the company's headquarters, and over the networks that connected them, the biggest challenge came from "the human factor," according to Morin.

"The biggest issue we ran across was in the process of understanding the flow of data between the restaurants and the headquarters," Morin says. "There was a little bit of re-engineering that had to be done on the corporate side. The accounting department was used to a manual process."

However, the new system's easy interface aided in its acceptance, according to Morin. That's a plus in the distributed restaurant business, where the most technical person in the field office is the accountant.

"Restauranters know very little about computer technology," Morin says. "The technology industry has passed them by."

However, the system now in place at the Cheesecake Factory lets end-users concentrate on their jobs without having to learn about remote access and other technology issues best left to the members of the IT department.

Instead, restauranters can come up with the recipes for the restaurant's multipage menu, including dozens of varieties of cheesecakes.

"I have gained about 10 to 15 pounds since I joined the company," Morin says.

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The leap to Windows 2000

No one is going to install Windows 2000 the day it comes out, but planning for the massive NOS upgrade can start this quarter

By Brooks Talley

If you believe what Microsoft says, 1999 is the year Windows 2000 — previously referred to as NT 5.0 — will ship. This major rewrite of the company's operating system, which promises to change just about everything found in Windows NT 4.0 except possibly the cursor, won't become available until the second half of the year at the earliest. But organizations thinking about adopting it should start preparing now. With

the massive architectural changes in Windows 2000, particularly on the more complex server side, it may take the better part of the year for customers to prepare for and grasp the new concepts in this upgraded OS.

Although Microsoft intends to squeeze something for everyone into Windows 2000, larger corporations will likely benefit most from the significant changes. Windows 2000 is designed to leave behind the OS' workgroup heritage. The new product will cater to sites that host tens of thousands of users with new features, such as a real directory service and a built-in software distribution system. Based on early Beta 2 of Windows 2000

and well-documented plans, it looks like Microsoft could succeed in courting enterprise customers — that is, if it can deliver everything it has promised.

A feature-complete Beta 3 of Windows 2000 is due later this quarter, but companies planning the move don't have to wait for the official release to start getting migration plans in order. Although no self-respecting organization would consider embracing and installing Windows

2000 the day it ships, there are things that can be done within today's NT 4.0 environments to ease the transition to Windows 2000.

THE BIG CHANGE. Among the many changes Microsoft is making to the next version of NT, the Active Directory that replaces the operating system's network domain model is likely the most significant. It may also be the main reason for large companies to upgrade. NT 4.0's domain model — how an NT network structures users and resources on a network today — has always been my single biggest complaint about NT networks. Theoretically, it can be set up elegantly, but inevitably it evolves into a mess of trust relationships — the glue that allows different domains to interoperate and share resources — so even administrators begin to lose track.

By enforcing hierarchical design and mapping the units in the network tree to well-known Domain Name Service (DNS) names, Active Directory promises to alleviate the many weaknesses the domain model caused: messy administration, confusing trust relationships, and the dual existence of computers — often with different names — in DNS and the domain.

However, migrating from the domain model to the new Active Directory in Windows 2000 will be quite an undertaking, because it means rearchitecting your network design. The migration will involve getting out a whiteboard and trying

to figure out where existing domains fit into the new Active Directory name space. For companies with just a few domains, this shouldn't be a problem. But many NT installations have hundreds of domains, and figuring out their relationships will be a challenge.

Wiseley, Microsoft isn't abandoning NT domains altogether — that would necessitate massive simultaneous client and server upgrades. Rather, the Active Directory encompasses domains, using them as smaller units in the larger hierarchy. To get started, you need to upgrade only the Primary Domain Controllers that will participate in the Active Directory.

LEVERAGING GOOD TECHNOLOGIES. One area in which Microsoft often excels — or opens itself up for anticompetitive scrutiny, depending on how you look at it — is in bolstering one of its products with another. Such is the case with Windows 2000's built-in software distribution model, the Application Installation Service (AIS), which makes good use of Active Directory.

Using this service, an administrator can assign an application to a group of users or a single user, and that application will automatically be installed wherever the associated user or user log in to the network. In addition, if the application has been damaged — if some of its files have been deleted, for example — it will be reinstalled. Because this AIS function will take on the simpler software distribution functions of Microsoft's Systems Management Server (SMS), which will afford larger-scale distribution, users may want to upgrade to the version of SMS that will



work with Windows 2000.

The software distribution capability leverages the Active Directory in two ways: The application is an attribute of a user or group, and the information on where to find the application on the network and how to install it resides in the Active Directory. Like the directory the AIS will appeal more to large organizations that have many users who roam around the network, as opposed to small companies that have a 1-1 ratio of client PCs to users.

DEATH OF NETBIOS. No doubt I'm not the only one celebrating the death of NetBIOS, Microsoft's proprietary networking protocol, in Windows 2000. With this upgrade, network administrators can say good riddance to this broadcast-happy protocol that creates excess network traffic, and say hello to everyone's favorite, IP. Although NT 4.0 could use IP, it was simply as a transport for the inelegant NetBIOS protocol. Windows 2000 is at heart an IP and DNS-based NOS. Microsoft will continue to support NetBIOS to support Windows 2000 to allow for backward compatibility.

Windows 2000's adoption of DNS for naming computers meant something had to be done to make sure DNS information stays accurate, even when Dynamic Host Configuration Protocol (DHCP)-configured hosts change addresses. The answer here is Dynamic Domain Name Server (DDNS), an Internet standard that allows hosts to dynamically update DNS information. In this way, Windows 2000 hosts can rely solely on DNS for naming, yet not lose the benefits of DHCP, which include IP address conservation and simplified administration.

The benefits of a pure IP and DDNS naming are clear: Computers will have only one name, and that name will exactly describe

where they are in the hierarchy. This will reduce administration effort, ease troubleshooting, and allow NT to integrate more smoothly in IP-oriented networks.

CLIENT ADMINISTRATION. Another boon for NT administrators that may frustrate end users is Windows 2000's inclusion of disk quotas — something NetWare administrators have enjoyed for more than one decade. Quotas limit the amount of space users can take up on the server on a per-user or per-group basis. In the past, server disk space has pretty much been a free-for-all, with no real way to measure or limit users' hunger for disk space. Many an NT administrator has suffered a bout of apoplexy upon discovering 40 copies of Quake in one user's directory. With quotas, such disk-hogging behavior will be easily limited.

Another disk enhancement is Windows 2000's capability to actually add new disks without rebooting the server. Again, this is something other network OSes have had for years, and NT administrators' prayers will finally be answered, Microsoft promises.

Big customer sites that run demanding programs on their NT application servers will benefit from Windows 2000's support of as much as 64GB of memory — 16 times NT 4.0's anemic 4GB limit. Though 4GB may seem like a lot of memory, it's not nearly capable of running an enterprise-class application.

BOONS FOR CUSTOMERS BIG AND SMALL.

In Windows 2000, Microsoft has been paying particular attention to an issue that is important to customers in big and small companies alike — security. This move is necessary, given NT 4.0's less-than-impressive record. Windows 2000 scraps the LAN Manager authentication scheme that plagued NT 4.0 and moves to a Kerberos-based scheme, which, in

Ten biggest changes in Windows 2000

1. **Active Directory:** organizes administrative information into a single, hierarchical directory
2. **Improved security:** Kerberos-based log-ins and IPsec support provide secure environment
3. **Windows Terminal Server:** allows true multiterminal access from low-cost terminals
4. **Application Installation Service:** automatically installs applications as users move around the network
5. **Improved disk management:** allows on-the-fly addition of storage
6. **Hierarchical storage management:** automatically moves infrequently used data to slower, less expensive media
7. **Microsoft Management Console:** integrates administrative functions into a single program
8. **64GB memory limit:** allows very large databases and other applications
9. **Disk quotas:** limits use of server disk space on a per-user or per-group basis
10. **Windows scripting host:** allows automation of common tasks

addition to providing tighter security, will allow integration with other platforms that support Kerberos. The public key certificate server is another step forward, allowing organizations to manage their own public key infrastructure. In theory, the transition to Kerberos should be transparent, but using the same network troubleshooting tools may be difficult.

The upgrade's inclusion of Windows Terminal Server (WTS) is another step forward for Windows 2000. Like Citrix's WinFrame, WTS allows multiple clients to connect to a server and get their own sessions, complete with the new graphical user interface. WTS not only simplifies administration — because each client's programs actually reside on the server — but it could potentially reduce the overall cost of an NT network. Memory, disk space, and processing power can be concentrated in a central server, allowing cheaper clients to be used.

Although WTS' simplified administration will likely attract departments or small companies that lack dedicated IT staff, the cost savings offered by reinventing old PCs as Windows terminals will appeal to customers across the board. As current implementations of Citrix have shown, users will need to boost server and networks before deploying thin clients.

CHANGES IN NT WORKSTATION.

PC users will not see nearly as much of a difference in NT Workstation 5.0 compared with the current version unless they are part of a network. But Microsoft has included a few strictly end-user features in NT Workstation 5.0, such as DirectX 6.0, a set of interfaces for graphics and sound that will let users play virtually every game that runs on Windows 98. It will also let users install peripherals that use the Universal Serial Bus specification, and will work with digital video disc devices.

Although NT Workstation 5.0 users sitting at their desks won't notice a big change, those on the road will. Notebook users who have been struggling to get NT 4.0

running smoothly on a mobile PC will be relieved to find the inclusion of decent power management and PC Card support in Windows 2000. NT 4.0 was virtually unusable on notebooks without proprietary, vendor-supplied extensions. Windows 2000 will support Advanced Configuration and Power Interface or ACPI, the new generation of power management, and will be capable of dynamically loading drivers to PC Cards when they're inserted. Additionally, Windows 2000 offers a new service to ease synchronization of files when they're used on a mobile system.

The whole Windows 2000 package is staggering in scope, and it's easy to understand why Microsoft is having such a hard time getting it all together. So far, the beta versions have been promising but understandably imperfect. Ironically, that difficulty itself shows some of Microsoft's lack of understanding of enterprise computing — you wouldn't catch IBM trying to roll this sheer volume of updates into a single release of OS/400 or OS/390.

Not only will this upgrade make NT ready for the enterprise, but hopefully the experience of building it will make Microsoft more ready as well.

Brooks Talley is the test manager at the InfoWorld Test Center. He can be reached at brooks_talley@infoworld.com.

DIRECTORIES: HOW, WHEN AND WITH WHOM?

Because Windows 2000's Active Directory may be the biggest incentive for upgrading to the latest version of Microsoft's operating system, it may also require the most preparation. Billed by Microsoft as a scalable directory service based on Internet standard technologies and fully integrated at the operating system level, Active Directory will certainly require some planning.

"There are millions and millions of lines of code in Windows 2000, and the Active Directory is going to cause people headaches as they install it and get it running," said a West Coast-based IT manager, who requested anonymity. He plans to migrate to Windows 2000 a few months after its release.

"Once it is up and running, Active Directory will solve a lot of problems for us. We have a distributed environment," the IT manager added. "Managing it after the upgrade will be enough to keep us busy, too."

To its credit, Microsoft has realized the work involved in moving users to Active Directory. The company is working on migration paths from its Exchange mail server and, more importantly, from competitor Novell's directory services.

"There are a couple of different sets of people to think about," said Jonathan Perera, Microsoft's lead product manager for Windows NT Server, in Redmond, Wash. "First off, there are those using Windows NT 4.0 today ... they need to be ready for Exchange-to-Active Directory migration. Windows 2000 automatically migrates users to Active Directory. IT managers should do some load-balancing testing and begin to learn about organizing information in the Active Directory."

"The second group going to Windows 2000 are people running [NetWare] 2.x and 3.x and [Novell] Directory Services, or NDS users," Perera added. "Beta 2 [of Windows 2000] introduces our NDS

migration tool."

Some users are interested in Windows 2000 but aren't ready to ditch Novell's products.

At the Georgetown University School of Business in Washington, Computing and Technical Services Director John Carpenter uses Novell's NetWare for his main administrative servers, with a few NT 4.0 servers for applications, IP management, Dynamic Host Configuration Protocol, and the Web. Carpenter says he prefers NT as an application platform, and NetWare as a network platform.

"Windows NT is really good for specific applications, and some Web stuff, too. But Novell has got it beat with NDS over the Active Directory," Carpenter says. "The ways they use administrative tools to administer the system are far superior in [NetWare] to NT 4.0. I got briefed at a Microsoft conference where they were talking about Windows 2000, and we've already got most of those

features in NetWare 4.1. For instance, simultaneous e-mail account creation — Novell has that for a year."

Carpenter plans to move the existing NT 4.0 servers to Windows 2000 eventually, but he's not about to replace his entire network with Microsoft's OS. Instead, he plans to upgrade to NetWare 5.0, which was released last summer.

But despite Windows 2000 repeated delays and Novell's one-year lead over Microsoft with its Version 5.0 release, NT has the mind-share advantage, according to one industry analyst.

"Novell can exploit [Windows 2000's repeated delays] for marketing purposes, but there's a large percentage of people who are going to sit and wait for NT no matter what Novell does in advance," said Dwight Davis, an analyst at Summit Strategies, in Kirkland, Wash.

—Bob Trout

TEST CENTER RX • LAURA WONNACOTT

There are exceptions to encryption export controls that can stymie your business

I have been in search of the ideal VPN [virtual private network] solution for secure routing between two networks via the Internet. I also want to provide traveling users with the ability to log in to the network via the Internet. My ideal feature list is rather simple. I want strong encryption that I can legally export. We have offices in the United States and London. The ideal solution should use passwords that are encrypted with the same strong encryption. I do not want passwords to pass through the Internet in clear text. Also, encryption should be modular so I can change or upgrade the type of encryption. Do you have any suggestions? Can I really have all that I want?

Adam Sawatzky

Sounds like you're one of the many victims of the great export debate. It's generally accepted that public key cryptography with a key size of 1,024 bits provides ample security for the United States. The U.S. government concurs that 1,024-bit keys are indeed secure and

powerful, and therefore a threat that must be controlled. The government's ability to crack enemy codes plays an important role in our military defense, and the government monitors hostile nations and terrorists on an ongoing basis. Strong cryptography is listed on the U.S. Munitions List as an export-controlled commodity, just like tanks and missiles, and is under the control of the International Traffic in Arms Regulations.

However, there is a more peaceful and business-oriented side of the debate. Many people believe that U.S. export controls inhibit our global competitiveness. We are unable to conduct secure international business transactions because our government forbids strong encryption. There is a definite need to strike a balance and make strong cryptography available for commercial use, while permitting intelligence agencies to do their jobs.

The U.S. government defines strong encryption as asymmetric cryptography — such as RSA with key sizes over 512 bits — or symmetric algorithms — such as the Data Encryption Standard (DES), International Data Encryption Algorithm, or RC5 with key sizes over 66 bits. But there are plenty of exceptions to the rules. For example, depending on the nature of your business and the type of information you want to send outside of the United States, you may be able to get a license to export with stronger encryption.



In September, the White House announced new policies on encryption export. These new regulations included 56-bit DES and serial relief. So if you are a subsidiary of a U.S. company (except within nations that the government has identified as terrorist threats) or an insurance company in one of the 45 countries recently approved for financial institution exports, you can use stronger encryption. Institutions such as health organizations and online merchants for client/server applications in those same 45 countries have relaxed restrictions. It's important to work closely with your vendor to get the appropriate government stamps to export strong encryption outside of the United States.

Export law is no simple matter, and the U.S. export law is vague in many areas. There's a big push to ease the export laws based on the country to which you are exporting information. In your case, I imagine it would be a lot easier to get a license to export to England than, say, the Middle East. I recommend you check out RSA's FAQ (www.rsa.com/rsalabs/faq/index.html) about cryptography, which covers the technical issues behind cryptography, export law, and the basics of information security.

We believe there is a solution for you. I spoke with our security guru Joel Scambray and our Test Manager Brooks Talley, and we recommend a solution that is based on the

Internet Engineering Task Force's IP Security (IPSec) protocol. This will provide the modularity you require. The IPSec working group defines a set of specifications for encryption in such areas as authentication, integrity, and confidentiality of services. The IPSec group's results provide the foundation for secure host-to-host pipes, encapsulated tunnels, and VPNs. For more information on IPSec, check out www.ietf.org/html.charters/ipsec-charter.html.

The VPN solution we recommend is Nortel's (formerly Bay Networks') and before that New Oak's Contivity 2000. Talley reviewed this solution in our Oct. 12, 1998, issue. It supports a variety of VPN technologies and provides secure and flexible access to your network. It supports L2F, Point to Point Tunneling Protocol, and IPSec and is designed to support as many as 200 users. If you have tighter requirements, check out the Contivity 4000.

Don't forget to submit your nominations for the Firefighter of the Year award, which will debut in our Product of the Year issue on Feb. 15. Tell me about the nominee, the problem, and of course, the solution. Also, feel free to share your story with others by joining our firefighter forum at www.infoworld.com.

Test Center Technical Director Laura Wonnacott has been working with computers for 15 years. Send her your questions at testcenter_rx@infoworld.com.

SECURITY WATCH • STUART MCCLURE & JOEL SCAMBRAY

Tricks of the trade obscure hacker tracks and make anonymity easily attainable

EVER WONDER HOW hackers can spend so much time online and rarely get caught? After all, everything they do on the Internet should be logged, right? Web hits, FTP sessions, Telnet connections, newsgroup postings, burps, and coughs should all be traceable, right? Then how do they pillage and plunder with such ease?

In the good old days, compromising university or government accounts and using them to bounce around the Internet was widespread. Hackers still use these techniques, but they cover their tracks. Temporary guest accounts, unrestricted proxy servers, buggy Wingate servers, and anonymous accounts can keep hackers carefree.

Hackers can become invisible on the Internet by obtaining a test account from an ISP. A hacker can call a small ISP, profess interest, and open a guest account for a couple of weeks by giving false information. Then, using Telnet, the unwanted guest can connect to any other compromised account.

University computers are notorious for

their easy accessibility to the public. Hackers can take advantage of the lack of monitoring to store the majority of their scripts and tools on the university system. And many universities give out free shell or Internet accounts to "students" supplying little more than a valid name and student registration number.

From there they can exploit old Wingate servers (www.wingate.com) that allow Telnet redirection by default. Discovered in early 1998, this bug permits unfettered Telnet access to anyone on the Internet through a Wingate proxy server. The bug has been fixed, but many sites have not yet applied the fix. Scanning a list of Wingate servers discovered at a popular hacker Web site, we found at least five (out of 127) machines still vulnerable to this bug. If you use Wingate, be sure to download Version 3.0, which fixes this and other problems.

Anonymous surfing

Proxy servers let small organizations protect their internal systems. But an improperly configured system can be vulnerable. Be sure to scan the external interface of your proxy servers. Check for open ports, especially ports 80 (unless you are Web publishing), 3128, 8080, and 1080. Out of 282 systems we scanned, more than one half (151) provide proxy services to the world. All Internet users have to do is change proxy settings in their Web browsers to an available proxy server, and it's clear sailing.



Some Web sites offer free anonymous Web surfing, which is a boon for all of us privacy paranoids out there, but a nightmare for law enforcement. Both CyberArmy (www.cyberarmy.com) and Anonymizer (www.anonymizer.com) offer free, albeit slow, anonymous Web surfing. Connecting to a Web page through their free services will mask your identity. Connecting through Anonymizer's ISP you get the following identity: Connect from solinfonex.com [209.75.196.2] (Mozilla /4.5 [en] (TurboOS/Turing Machine; 0.0)logged).

And from CyberArmy's redirector server you get this identity: Connect from s214-50.9natmp [216.22.214.50] (Mozilla/4.01 (compatible; NORAD National Defence Network)logged).

TuringOS and NORAD National Defence are spoofed origins that mask the originating system.

Lucent also has a proxy server meant to protect your privacy (www.lpw.com). Like the others, the Lucent Personalized Web Assistant can make you anonymous by tunneling all of your Web traffic through its proxy server. The only difference with Lucent is you must provide your e-mail address to sign in.

Anonymous service providers such as Anonymizer and Lucent have the right intentions — protecting your privacy — but like any umbrella they can be abused. Services such as these can be a hacker's dream.

Anonymizer offers Internet security and privacy for corporate customers and individuals, and effectively makes them invisible. They don't store cookies, they block Java and JavaScript access, and they remove all identifier strings.

To its credit, Anonymizer severely limits to whom they give shell accounts. But at \$7 a month, anyone with a good story should be able to obtain one. They keep logs for 48 hours but don't record the source IP address. To guard against abuse, Anonymizer will shut down service to a particular Web site if abuse is reported. But with no source IP logging, it must shut down service to that site for all customers.

Privacy cheerleading

Don't get us wrong, we are the first to jump on the privacy bandwagon whenever it rolls by, but at what cost? Even if all of the software bugs contributing to anonymous connections are fixed, more and more ISPs will inevitably offer anonymous connectivity. How will you defend your site against the possible onslaught of phantom hack attempts? Will logged IP addresses quickly turn into ghosts offering little more than a place to begin? Let us know at security_watch@infoworld.com.

Stuart McClure, a senior manager at Ernst & Young's Information Security Services, and InfoWorld Technology Analyst Joel Scambray have managed information security in academic, corporate, and government environments for the past nine years.

TECH SPOTLIGHT

Insight into cutting-edge technologies

Next stop, the desktop?

At issue

Linux on the desktop:

The open-source operating system has been so wildly popular on many types of servers that some think it could be a credible alternative to Microsoft Windows on the desktop

By Chip Brookshaw

As the Linux phenomenon has spread, visions of its success have grown as well, fed by a perennial desire for an alternative to Windows. Several platforms, including OS/2 and the Macintosh, have already battled Windows for the desktop, and in 1998 Linux was enlisted for the same campaign. One year ago, few outside the Linux developer community had even heard of the upstart OS, and longtime users can claim that this Unix variant for inexpensive PC hardware was neither intended nor engineered to be a desktop Windows-killer. Regardless, there is a growing view that if Linux can take share on the server (as it has), it could take seats on the desktop.

There are a number of perceived benefits to Linux becoming a desktop alternative to Windows. Linux is free to use and distribute, which could save companies a bundle in licensing fees. Several Linux productivity applications are also free or inexpensive, potentially saving even more money. Many also feel that Linux is a far more stable platform than Windows' shaky tower of DLLs and registry settings. And because the Linux kernel is not proprietary, the playing field for application vendors is level. No vendor controls the source code, so no vendor can leverage Linux to its benefit.

Linux has a powerful Unix-like command line, and many Linux pros have no need or desire for a GUI. But if Linux is to become a giant-killer on the desktop, it must be judged against Windows by mainstream users. Given the state of Linux development though, the experience of such users fluent with WIMP (windows, icons, menus, pointer), but not with text prompts, is likely to be a mixed one.

On one hand, several popular window managers provide Linux with WIMP interfaces and file managers that echo many Windows conventions. There are also numerous productivity applications, such as browsers and office suites, available for Linux. For the most part, these applications have a Windows look and feel and offer functionality that is comparable to their Windows counterparts.

Despite the slew of impressive applications and interfaces though, Linux will not be an acceptable corporate alternative to Windows until hardware-compatibility issues are resolved and all aspects of installation and configuration are achievable in the desktop environment. For most users, the learning curve required to transform a Linux box into a "personal" computer is too steep.

HOW IT WORKS

Those interested in using Linux as a desktop OS should acquire one of the prepackaged distributions, which typically comprise a stable kernel and a set of tools and applications that make Linux easier and more worthwhile to use. Depending on the distribution, these sets of extras vary widely. Differences include processor support, installation and configuration utilities, window managers, and bundled applications. There are at least a dozen distributions, but Red Hat Software and Caldera supply two of the most popular. Red Hat Linux 5.2 and Caldera OpenLinux 1.3, respectively, are their most recent versions.

To create a graphical desktop for Linux, a

start button often overlap each other, obscuring navigation. Using the scroll bars is frustrating as well. The left mouse button scrolls down, but the right mouse button is required to scroll up. Also, selecting a window's close box briefly turns the cursor into a skull and crossbones — not very reassuring for a new user.

The K Desktop Environment (KDE), on the other hand, is much more inviting. KDE is the handiwork of the KDE project, a collection of software developers using the open-source model, and Caldera has integrated the software into its OpenLinux distribution. (KDE can also run on Red Hat Linux 5.2.) The Common Desktop Interface

Layers and layers of Linux

Desktop Linux applications are the icing on a Linux layer cake whose foundation is the famous open-source kernel. Most users run Linux distributions, which typically include the kernel, one or more window managers, and productivity applications.

Applications		
• WordPerfect	• StarOffice suite	• AppWare suite
• Netscape Communicator	• GIMP image editor	
Window managers		
• KDE	• CDE	• FVWM2
• GNOME	• Many others	
Distributions		
• Red Hat	• Caldera	• Others
Kernel		

Numerous free or inexpensive desktop applications are available for Linux, including word processors, integrated office suites, Web browsers, and image editors. However, Linux lacks versions of many popular corporate programs, such as Lotus Notes.

Also known as desktop environments, window managers provide WIMP (windows, icons, menus, pointer) interfaces and file managers for Linux. Generally, any shell can be used with any distribution, although there may be installation issues or other incompatibilities.

There are more than one dozen Linux distributions, which typically comprise a stable kernel, installation and configuration utilities, window managers, and bundled applications.

An open-source kernel, the Linux graphical subsystem, and additional tools from the Free Software Foundation's GNU project provide the foundation for Linux on the desktop.

window manager (also called a desktop environment) must be installed atop the kernel. There are scores of window managers. Some are little more than garage hacks; others are the result of large collaborative efforts. Many window managers are further customizable with a vast number of plug-in themes, ranging from functional (a Mac OS look) to whimsical (a carnival motif). Generally, any window manager can be used with any distribution, although there may be installation issues or other incompatibilities.

Red Hat's latest distribution includes three window managers; the default is FVWM2 with a Windows 95 look-alike interface. FVWM2 is functional, but it is only a crude approximation of Windows 95. Although it uses a start button and taskbar along the lower edge of the display, FVWM2 has so many oddities that migrating Windows 95 users to it would be disastrous.

For instance, menus that cascade off the

(CDE), a window manager that has been available for years on Unix, is another widely used GUI, but KDE has won over many in the Linux community.

With minor differences, KDE follows most standard Windows conventions. For instance, the two-paneled file manager has icon and tree views and can be used to browse the Web just like Windows Explorer. Drag-and-drop functionality is available for moving and copying files, and there is a trash can for deleting them. KDE does not have the zooming, sliding menus of Windows 98, but it keeps many other touches, including subtly shaded title bars and tool tips that pop up when the cursor lingers over an icon.

There are two major interface differences between Windows and KDE. By default, KDE uses two taskbars along the display edges: One is a dynamic list of open windows, and one acts as a dedicated application and utility launcher. Although it takes up more screen



AT A GLANCE

Linux on the desktop

The variety and maturity of Linux applications and desktop environments has never been greater — and more are in the pipeline for 1999. However, for those who are not comfortable at a command line, Linux can be inscrutable to install and configure. The result is that Linux is not yet a viable alternative for corporate desktops. Working within Linux nearly equals the Windows 98 experience, but working with Linux is more difficult than using Windows 3.1.

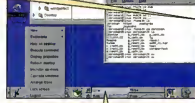
• **Pros:** Growing number of free or inexpensive, full-featured productivity applications; sophisticated, attractive desktop environments.

• **Cons:** Command line required to make system changes; hardware incompatibilities; no versions of many corporate applications.

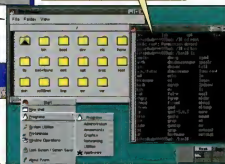
The K Desktop Environment (KDE, left) offers much more than FVWM2 (right), a Windows 95 look-alike that is the default window manager for Red Hat Linux. In addition to its superior look, KDE includes tool tips, dockable toolbars, and an Explorer-like file manager that can browse local and Internet content.



Regardless of the desktop environment you choose, using Linux still requires working a command line to install hardware, load software, or make other system-level changes.



KDE (above) uses separate window and application taskbars by default; FVWM2 (right) uses a Windows 95-like start button and all-purpose taskbar. Both KDE and FVWM2 offer virtual desktops, accessible via taskbar buttons or a floating palette, respectively.



real estate, KDE's design is more logical. Also, it is easier to customize the launcher taskbar than it is to configure the Programs menu that drops from Windows' start button.

The other important difference, virtual desktops, is something all Linux window managers/desktop environments — not just KDE — offer to some degree. FVWM2 and KDE come with as many as eight virtual desktops by default, accessible via buttons on a taskbar. Part of the X Window graphical subsystem, Linux's virtual desktops are a descendant of the days when scarce Unix workstations had to be shared, but they can help individual users organize their work as well. As the name implies, virtual desktops offer separate workspaces that can include any combination of open files, folders, and applications. For instance, you could have a calculator and spreadsheet open in one, a browser open in another, and a command line and file manager open in a third.

THE ENTERPRISE ROLE

Linux desktop environments are relatively mature, but without applications all of those pretty faces are not much use in a corporate setting. Fortunately, several vendors have developed free, or relatively inexpensive, Linux versions of their software. They are the reason that Linux can even be considered a desktop alternative to Windows.

Most Linux distributions include Netscape Communicator, with its standard package of browser, e-mail, discussion group, and HTML editor clients. The browser matches

the features of the Windows version, including Java and Secure Sockets Layer (SSL) support, and provides an easy way for users to download the productivity applications that many vendors have made available.

The first program some will want to grab off the Web is Corel's WordPerfect 8 for Linux, Personal Edition. The downloadable version is free, although it is limited to personal use and does not include documentation or charting/drawing functions. Still, the Personal Edition is a powerful word processor that can translate Microsoft Word documents. For business customers, a full-feature, shrink-wrapped version will soon be available priced at about \$50 retail.

Another useful download is Star Division's new StarOffice 5.0, Personal Edition, a productivity package that mimics the look and feel of Windows 98 so closely that it could be one's primary desktop interface for most situations. It is a little confusing at first, but StarOffice puts its Windows 98-like shell over

your Linux window manager of choice. StarOffice employs a browser-like file manager, similar to KDE and Windows Explorer, that can be used to navigate both local and Internet content.

StarOffice also includes Microsoft Office-like and Outlook-like applications: word processor, spreadsheet, presentation graphics program, e-mail package, calendar, and so on. It is an impressive bundle, and it is free for personal use. (Star Division is also selling a version for corporate customers priced at \$169.) Our preliminary tests on StarOffice revealed some bugs, but it is worth a trial.

Another popular Linux office suite is Applix's Applixware, which includes a word processor, spreadsheet, presentation graphics application, paint program, and other tools. Red Hat Linux comes with a demo version of Applixware; the fully functional edition is bundled with S.U.S.E.'s Linux distribution, or it can be purchased from Applix's Web site for \$99.

TECHNOLOGY TIME LINE

Two important desktop-related releases are expected this year from leading Linux developers, but other vendors remain uncommitted to the platform. This could change if Linux grows as exponentially in 1999 as it did in 1998, but for now many of the applications that corporate users rely on are not available for Linux.

The lack of a Linux version of Lotus Notes is particularly glaring, given that product's large share of the corporate desktop messaging market. Lotus offers a version of Notes for Solaris but will say only that it is considering a Linux port. Also, despite a Linux image-editing tool called GNU Image Manipulation Program (GIMP), graphics professionals have little choice but to stick with Macintosh or Windows machines. Adobe and Quark officials said they have no plans to offer Linux versions of Photoshop and Quark, respectively. (Even if they did, standard font support makes Linux an unattractive graphics platform.)

Not surprisingly, Microsoft has no plans to port its applications, including Internet Explorer, to a potential rival. On the bright side, Netscape said it will keep the Linux version of Communicator up to date, despite the company's acquisition by America Online.

One important software release scheduled for 1999 is the KDE project's KOffice, currently in alpha stage. KOffice includes familiar productivity applications (a word processor, spreadsheet, presentation graphics program, and so on) and may turn out to be a better alternative for KDE users than StarOffice or Applixware because of its integration with that desktop environment.

The most anticipated development, however, is Red Hat's next Linux distribution, due in the first half of the year. The new Red Hat release will use GNU Network Object Model Environment (GNOME) instead of FVWM2 as its default desktop environment. GNOME is not tied to any one window manager, but is the most often used with Enlightenment, a slick KDE-like interface. Although Red Hat has not officially committed to using Enlightenment, a GNOME/Enlightenment combination would be a huge improvement over FVWM2, both in looks and brains.

Still, regardless of the variety and sophistication of its desktop environments and applications, Linux will not be a credible desktop alternative for corporate users until configuration and hardware-compatibility issues are greatly improved. It is a lot to expect so soon — especially considering Microsoft, Apple, and others have been working on similar issues since the mid-1980s. But given the success thus far of the open-source model, and the size and enthusiasm of the developer community, nothing that happens surrounding Linux should be a surprise. Just look how far things came in 1998.

One user's first kernel shows where Linux needs work to become a desktop alternative

Hardware incompatibilities and command-line configuration are the biggest impediments to Linux becoming a credible desktop alternative to Windows. Although corporate users typically do not load their own operating systems, some reinstall the OS when troubleshooting, or install additional applications and hardware as necessary. And even novice users customize settings such as monitor resolution and desktop icons. Under Linux though, these are not point-and-click tasks, and this user's first experience with the OS felt like a return to the days of Windows 3.1, when even minor system changes meant a prison sentence at the command line.

Without realizing it, my first mistake was using a Compaq box. A freshly formatted 200-MHz DeskPro with an SVGA video card and a Netelligent network interface card (NIC) I used Red Hat Software's start-up diskette to bootstrap the machine, then popped in the installation CD-ROM. Hearing advice in the manual, I chose a workstation installation, which Red Hat officials said was appropriate for a new user.

For a while, the manual followed the options and choices that appeared on-screen, occasionally offering helpful novice-level information. It was not long, however, before questions arose for which the manual offered no assistance. Most frustrating was the lack of any explanation about configuring display settings. I was using a generic monitor, but selecting that option during installation scrambled the display.

Stumped after several more unsuccessful installations, I consulted two Test Center analysts.

"Oh," the analysts said, seeing my hardware. "You don't want to use a Compaq box with Linux. They don't play well together."

I was unable to determine the specific problem — it may have been the chip set, video card, or something else — but the situation points out one of Linux's biggest weaknesses — widespread hardware incompatibility. Windows users can safely buy PCs and peripherals without consulting a list of supported hardware; Linux users do not have the same freedom. Although plug-and-play is not perfect, it is a vast improvement over the hardware conflicts that can rampant under Windows 3.1. Linux needs something similar.

Compaq, for instance, is one of the largest corporate providers of PC hardware, and even word-of-mouth that Linux does not "play well" with Compaq PCs would eliminate it from consideration in many companies.

More to do for the Linux crew

Installation was much smoother on a Micron PC, although configuring display settings was still a trial-and-error process. With a "start" at the text prompt (again, shades of Windows 3.1 and the "win" command), my Linux box was up and running. Although the workstation was generally stable, claims about the Linux platform being "bulletproof" cannot extend to the application layer. Netscape and StarOffice, for

instance, occasionally crashed during testing.

Several Linux desktop environments and applications are attractive, logically designed, and comparable to their Windows counterparts (see main article). But making system-level changes to the workstation was more complicated than performing the same job in Windows. For instance, to copy applications and files from CD-ROMs and diskettes, I first had to issue command-line instructions to mount the media, then run a separate application (called a package manager) to load the software.

The situation was similar for applications downloaded from the Web. Entering five lines of commands found in a "readme" file to expand a software package is not rocket science, but it is the kind of task average users expect to be automated. File management chores, such as copying a document or creating an application shortcut, were a mixed bag, depending on the window manager or desktop environment used. In most cases, the K Desktop Environment (KDE) made things much easier than FVWM2, the default window manager for Red Hat Linux.

Still, even with KDE, Linux is not yet ready to replace Windows. Even moderately tech-savvy users curious about exploring Linux as a desktop alternative will need more than 17 managers than a copy of their favorite distribution. Make sure users have realistic expectations, and be prepared to adopt the ethic of the Linux community, where assistance is freely and generously given.

— Chip Brookshaw

Chip Brookshaw is an editor at large at the InfoWorld Test Center. He can be reached at chip_brookshaw@infoworld.com. Technology Analyst Kevin Rainsack, Senior Analyst Jeff Symons, and InfoWorld contributor Tom Yager provided background for this article.

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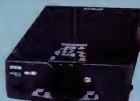
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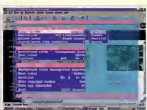
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tax. monthly cost	\$14.95	\$19.95	\$19.95	\$139.95	\$299.95	\$899.95	\$3000.00	
tax. profit of \$19.95 domain	N/A	N/A	\$499.75	\$499.75	\$1,499.25	\$4,997.50	\$19,990.00	
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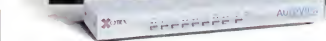
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PEER PERSPECTIVES

Managing change

Involving many people in change leads to complication, acceptance

AS THE PACE OF CHANGE accelerates, getting both IT staff members and users to accept innovations in technology is crucial. We asked the experts — people involved in IT — for advice.

"If you take the time to help people connect what they are trying to accomplish — or avoid — to the changes coming about, they are more likely to accept those changes. If instead you simply offer some version of 'This is better' or 'Try it, you'll like it,' they are going to feel like you are taking something away from them or making life harder for them — and they will resist, and perhaps sabotage, the change.

"A simple example: Many people initially respond negatively when help desk support is provided via a Web site instead of via a traditional phone call. When they realize the response time is often quicker and the responses themselves are more complete, they embrace the change."

— Paul Lemberg, managing partner, Lemberg & Co., Escondido, Calif.

"I have seen technology readily accepted and adopted which I thought would be ignored or underutilized, and I have seen people not use technology which they begged for. When I get clear requirements up front and involve users in the process all along the way, the adoption of the product is better.

"Also, senior management sponsorship is critical. Group calendaring is a good example — when I saw all the senior managers actually using it, other people followed."

— Kim Wennerberg, business analyst, Emery Worldwide, Portland, Ore.

"The edict from on high at our company is to 'overcommunicate.' That means early involvement from the people affected. Without that early involvement, we have had issues with users who feel like they are getting something crammed down their throats. If we approach it as a partnership, where the company has a business problem and needs to locate the appropriate solution and manage it as a joint IT-business unit decision, the level of cooperation goes way up.

"It doesn't always work. Sometimes there isn't buy-in about the new business process itself, much less the technology used to effect it. We have also had situations where the wrong decisions are made by the users. That makes for an ugly situation for the IT manager: Do you pull rank and override the decision or let it move ahead and fail? Ideally, you are able to effectively communicate the problems with their solution and lead them down the right path."

— John White, manager of enterprise computing, Cluett, Peabody and Co., Atlanta

Shift in IT roles ahead

■ Changes in business and technology will alter IT careers

By Thomas York

WILL THE IT department as we know it disappear in the 21st century? Or will demand for IT professionals become so great that they command compensation packages comparable to those of senior executives? Could both these predictions come true?

Crystal balls are notoriously inaccurate when it comes to long-term predictions about the business world. However, the changes in technology and in the structure of the IT organization that are beginning today offer a glimpse of the long-term future of IT departments and IT professionals' careers.

For example, most experts say the network — a combination of the Internet and other types of digital connections — will play an even more central role in business in the future. This will mean more IT work, but fewer inside the organization will be doing it: More work will be dispersed to business units and handled by the technology-savvy managers of those units.

The rush to install enterprise resource planning (ERP) systems to automate procedures and centralize the flow of information is another technology trend that is already revolutionizing IT's role.

"Business is beginning to figure out how to use information more effectively," says Jim Ware, vice president at the Kingwood, Texas-based Concours Group, a management consulting company.

Ware says the \$15 billion-per-year ERP industry is already defining the direction that business will take beyond 2000. More and more companies are expected to jump on this bandwagon and automate both front-end and back-end business systems.

"This is what managing an information-rich business is all about," Ware says. It is also what the future holds for businesses in the next century, he adds.

Microsoft offers one example of a com-



pany where this change is already under way. Almost three years ago, the company installed SAP's ERP system, which has enabled Microsoft to cut operating costs while increasing efficiency, says Mike Adams, director of SAP services in Microsoft's information technology group.

It has allowed the Redmond, Wash.-based software giant to reduce the number of transaction systems from 50 to one, and has given top executives same-day financial information. The installation has also let Microsoft decrease the role and number of IT workers, Adams says.

That kind of fallout has IT managers everywhere pondering their futures.

ORGANIZATIONAL OUTLOOK. Fred Magee, vice president and analyst at the Gartner Group, in Stamford, Conn., predicts that IT departments will become less centralized as businesses evolve.

They will have to give up their "command-and-control" style of leadership for one geared more toward "coordination, guidance, and learning," Magee says.

As companies abandon traditional top-down organizational structures in favor of collaborative management philosophies, the world will become much more challenging for those in IT.

Magee notes that leading-edge organi-

zations are already dispersing their workforces, as well as their decision making, at the same time that they are centralizing critical information so every worker has access to the same information. This trend is expected to continue into the 2000s — and it signals profound changes for IT.

Chris Morgan, a Boston-based writer and futurist for the Association for Computing Machinery, believes technological advances will accelerate these changes.

"[Technology] will become invisible," and much easier to use, Morgan predicts. In fact, which technologies are used won't be as important as how they are deployed.

That's bad news for IT departments. ■ **FUTURE OF IT page 26**

IT today and tomorrow

Experts predict that IT departments will change dramatically in the next few years.

Now	In the future
Centralized	Decentralized
Technology-driven	Business-driven
Rigid	Flexible
organizational chart	organizational chart
Non-collaborative	Collaborative
Permanent workers	Temporary workers
Risk-averse	Risk-tolerant

IT skills for the next century

- Understand project management
- Manage for results
- Speak the language of business
- Impart with grace and harmony
- Understand IT processes and business processes
- Make informed decisions quickly
- Know how and when to measure performance
- Cultivate an environment of risk tolerance
- Communicate clearly, appropriately, and relentlessly

SOURCE: GARTNER GROUP INC.

SPECIAL REPORT: IT IN 2000 AND BEYOND, PART ONE

Future of IT

Continued from page 75

Morgan says. They won't have as much work to do as increasing numbers of technology-savvy managers enter the workforce. These managers will take control of IT projects; technical specialists may end up working directly for this new generation of managers instead of for the IT department.

Ian Morrison, a writer and senior research fellow at the Institute for the Future, in Menlo Park, Calif., echoes the view that IT departments will shrink. He foresees a time in the not too distant future when hard-core technology functions will be heavily outsourced, much more so than today. Outsourcing will relegate internal IT departments' role to that of the infamous Maytag repair man.

Morrison's prediction: "There will be no IT department."

But not everyone thinks that the familiar IT organization will disappear.

Adams thinks that organizations of the future will meld into a hybrid of centralized and decentralized departments.

Microsoft has been able to follow this model, Adams says, and he predicts that many other organizations will follow suit.

"We have a widely distributed IT group

spread across a number of different business units," Adams notes. "But we still have a strong central department and a strong CIO coordinating this activity."

CAREER CONTINGENCIES. No one knows, of course, which of these predictions will come true. But it is clear that IT's role will change — and that IT professionals' careers will change as well.

Ware and others say flexibility and collaboration will be key for everyone in IT.

Ware points to a chain of hospitals on the East Coast where IT managers and their workers are coping with future shock as they build an internal system to buy supplies for the hospital chain.

Managers not only have to work with each other in the corporate office, but they also must coordinate their efforts with their counterparts in individual hospitals as well as with the myriad vendors that supply the hospitals.

IT managers are also trying to devise systems that will allow individual hospitals to draw supplies from each other as well as from corporate warehouses.

"It's tough," Ware says. "It requires a whole new set of skills."

The skill set of the CIO is already changing in response to the evolving responsibilities of the position within the organization.

Magee notes that in the recent past, CIO recruits possessed about 60 percent technical

savvy and 40 percent general business background. Today, the split is closer to 50-50.

"This is an indication that business wants more business acumen in the organization," Magee says.

Ware expects this ratio to change even more dramatically in the future.

Despite the changes that everyone agrees are coming for IT departments, some crystal-ball gazers think the changes will be positive for individual IT professionals.

Dominique Black, chief executive officer at Redwood Shores, Calif.-based Advanced Technology Staffing, agrees that the role of the IT department may change — perhaps radically — in the years ahead.

But that's good news for top-performing IT managers and their staffs, says Black, who has written a number of white papers on trends in IT.

"The rate of change is accelerating, and new business models are emerging," Black says. To stay on top, companies will compete aggressively for talent.

This scramble to hire top talent in the coming years will force companies — large and small — to pay top dollar, Black says. That means old-line industries will be competing with the hot technology companies as most shift to online business models.

To best their competitors, Black says, companies will be forced to offer such enticements as signing and performance bonuses,

not to mention stock-option programs "just the same as top executives."

"It's going to be very competitive," Black predicts.

Thomas York is a free-lance writer in San Jose, Calif.

TALK BACK

Throughout 1999, Enterprise Careers will periodically look at how the IT profession may change in the next century. In this issue, we examine what will happen to the IT organization; future reports will discuss topics such as changes in training, technology, and compensation.

Send your comments and ideas for future topics to margaret.steen@infoworld.com.

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► Should you plan your career 10 years in advance?

Margaret Steen answers readers' questions online.

FORUM TALK

Will IT be outsourced or finally in the corporate loop?

These edited excerpts of a recent InfoWorld Electronic forum on the future of IT provide a sample of readers' opinions. For the full discussion, go to www.infoworld.com and click on the forums button.

The future is outsourcing

"Yes, we will be outsourcing more. I don't see it happening to our help desk... yet, but definitely for project work. We are a small shop (12 IT professionals serving 300 or so users) in a rapidly changing and growing company, and we simply can't keep up. We constantly need to fill gaps (either staffing shortages or technical skill-set shortages) with contract programmers or engineers or specialists in a certain technology... What will happen to IT and my job in 2000? I am definitely getting drawn into business processes and issues more and more."

"My prediction is that over the next three to five years, an increasing number of the best people in IS will move to either consulting or outsourcing firms and away from internal employment. That way they will either be able to work on things they enjoy and not worry about being 'out of the loop' or find themselves in a position... where their former peers' will be forced to deal with them on a peer-to-peer basis. ... Internal IS and human resources groups

are going to be slow to catch on to why they can't get top-notch people anymore, though."

"Some consultants start out with this naive vision that they'll ride in... and save the day for clients. Their heroic dream is to say whatever they want, whenever they want as paid experts. To a certain extent, that is true — observe how companies will most likely value the outside consultant's word, not the in-house employees who may have said the same thing. But every so often I hear from an employee-turned-consultant a disappointing *déjà vu*. Flashbacks of the time they had as an employee are recalled, resonant with the previous, 'Thank you very much for attending, and please fix my printer on your way out of the executive suite.'"

Companies don't value generalists

"Ten years ago, the word in Silicon Valley was that if things were not so hot at your current company, you could literally walk across the street and get hired instantly. If you knew only three out of five things, that would be good enough. Your motivation to learn the other two was a strong selling point to bring you on board. Nowadays, enthusiasm takes a back seat to technical knowledge. With today's harried schedules based on working in Internet time, any time a new hire spends on learning is seen as [something that] will cause the company to miss its marketing window... The industry needs to value the generalist.

Otherwise, expect more of this incessant job-hopping where workers leave projects in a lurch to avoid the deadlier plague of obsolescence."

"They want what they want, and they want it now! No adjustment period allowed: 'You mean we cannot find a C++, ASP, Oracle, SAP, PowerBuilder, EDI, NT, IIS, Cobol, Access, Cold Fusion, NetWare, FOK 1.0, YU 2.0 expert? Gee, there must be a labor shortage! Let's call Fibs & Gloat. They can always find someone, even if they don't always meet our expectations.'"

IT's business influence

"Where I disagree is in how much influence the professional IS person has in the average (North American, Fortune 1000) business environment. In my [recent] experience, not much. You might get named a senior manager, division head, or even CIO. You might be invited to some of the less important management discussions. But your opinion won't be solicited, or considered, when the really critical decisions are made. You can easily walk one morning and find a message from the CEO and CFO to get SAP in place by next year. Oops — you didn't even know ERP was under discussion... Who makes the real decisions? Consultants on the strategic side and outsiders on the operations side... Why? Because those who make the decisions have to get advice from somewhere."

IS SURVIVAL GUIDE • BOB LEWIS

You need to plan carefully to develop leaders who can unite your employees

"I'm the boss. You're an idiot."

— Old Russian proverb, shared by IS Survivalist Dave Wanson

EVERY SO OFTEN, incredible leaders appear — people who unite whole populations to a common purpose. People like Alexander, Ataturk, Elizabeth, and Attilla.

You only have to unite IS, not all of Central Asia, but the lesson is the same: When you lead, everything is multiplied. Lead well and you will achieve great things. Lead poorly, abstain, or lead well but in the wrong direction, and things get ugly fast.

Leadership is the 15th episode in our series on creating an integrated IS plan. Planning for leadership may seem like a strange idea, but doesn't expecting leadership to happen by accident seem even stranger?

You need a leadership plan — not to populate your leadership team with interchangeable clones, but to find that happy center where managers have latitude without fragmenting your organization into a collection



of separate fiefdoms.

What are the key elements of your leadership plan?

■ **Skills inventory management.** Your plan should describe how you will balance training internal staff, contracting with outside experts, and recruiting experienced practitioners to ensure that your organization has sufficient skills.

■ **Staff growth plan.** Employees need depth, experience, judgment, perspective — that is, professional growth — and the increasing levels of responsibility and influence that reflect and take advantage of it. This isn't fuzzy stuff; it gets down to hard decisions such as, "We can't promote Pauline because she doesn't have anyone to take over maintenance of the payroll system." And before you say something like, "That's why they call it 'work,'" remember: If you don't give Pauline these opportunities, someone else will, and you still won't have anyone to take over payroll maintenance.

■ **Compensation and incentives plan.** Depending on how you count, the best pro-

grammers (for example) are between five and 50 times more productive than average ones. Most companies peg salary levels to "the marketplace" and pay the best workers no more than about three times the lowest entry-level salary. The disparity demoralizes your best people, but history has repeatedly shown that the marketplace must set prices rather than any intrinsic assessment of value. Once you assess performance, your tools for managing the tension between market and value are salary, spot bonuses, at-risk pay/annual bonuses, stock ownership, promotions, and nonfinancial incentives. Each has a role. Make sure every leader understands and uses them all.

■ **Culture plan.** Culture is the behavior people exhibit in response to their environment; most of their environment is other people's behavior. Telling employees to change their response is pointless. The only lever you have is the behavior of the leadership team. Define the culture you want in concrete behavior and attitudinal terms, and figure out how the leadership team must act to foster the change.

■ **Communication plan.** Should all information flow through the chain of command? (No.) Should you regularly send broadcast e-mail to the whole organization? (Yes.) How do you find out what's really going on in your organization? Planning how you're going to communicate with employees is important. Planning how you're going to listen to them so you can get unfettered information is vital. Creating the expectation that you'll do so is the most important of all.

■ **Leadership training plan.** Did you think wishing would make it so? In addition to for-



mal training, schedule role-playing exercises to elucidate how leaders should handle difficult situations, such as giving bad news, giving good news (if it isn't difficult, why are so many leaders really bad at it?), leading meetings, delegating — all of the behaviors and attitudes for which you want to create a common understanding. Some people gripe about role-playing exercises. My own experience is that those who gripe the loudest think they're good at leadership but aren't.

Effective leadership means harmonizing all of these elements to consistently set direction and encourage the best performance from every employee. That takes planning, because it's too complex to rely on improvisation.

How do you plan for leadership? Send e-mail to Bob_Lewis@icsi.com, or join his forum

on InfoWorld Electric (www.infoworld.com). Bob Lewis is a Minneapolis-based consultant at Perot Systems.



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January 18	Washington, DC/Tysons Corner, VA	January 18
January 25	Atlanta, GA	January 26
February 22	Philadelphia, PA	February 24
March 8	St. Louis, MO	March 8
March 8	New York, NY	March 9
April 5	Dallas, TX	April 6
April 19	Chicago, IL	April 20
May 3	Detroit, MI	May 4
May 17	Los Angeles, CA	May 19
June 14	Atlanta, GA	June 15
June 21	New Jersey	June 22
July 19	Cincinnati, OH	July 20
July 19	Washington, DC/Tysons Corner, VA	July 19
July 19	Philadelphia, PA	July 27
September 20	Chicago, IL	September 21
September 20	New York, NY	September 22
September 27	Los Angeles, CA	September 29
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Diversity Comes of Age

by Julie Conery

Over the past 20 to 30 years, building a diverse workforce that included employees from non-traditional or underrepresented groups was a goal of many companies. In 1999, in the world of IT, diversity is essentially a given. Many companies have learned that what was once an obligation now is a benefit, a lure, and an absolute business necessity. In this special advertising supplement, we look at three companies where diversity has become an essential characteristic of the work environment.

Microsoft

LaVonne Dorsey is a Diversity Recruiting Specialist at software giant Microsoft in Redmond, WA. Microsoft has about 27,000 employees worldwide, but most of the IT product development positions are in Redmond.

"We believe recognizing diversity has helped keep our company's retention rate among the highest in the industry," Dorsey notes. Openings range from software design engineers to software test engineers, as well as financial analysts, enterprise system engineers and technical consultants.

"We live in a global community and compete in a global market," Dorsey continues. "A company with a diverse employee base will best meet the needs of a diverse customer base. Currently, 45 percent of our revenues come from international markets. To remain competitive, we need to identify untapped diverse markets and understand the customer in those markets. Diversity has become a key component of competitive advantage. It means making our products accessible, localized, effectively marketed and meaningful to all people."

Microsoft's recruiting goal is to hire underrepresented minorities and women. The company has built relationships with key minority and women's organizations, such as the National Black MBA Association, the National Society of Hispanic MBAs, the American Indian Science and Engineering Society, and Women in Technology International. The company's ad agency specializes in diversity recruitment; ads appear in publications such as *Black Enterprise*, *Hispanic Business* and *Women in Technology International Magazine*. Microsoft was named number two out of 10 in the National Society of Black Engineers' 10th annual Employer Preference Survey. Microsoft also has a very strong campus recruiting program. "I'll quote an employee: 'There's room

for all different kinds of people here,'" Dorsey says.

"Thirteen employee-run groups, including Blacks at Microsoft, Gay and Lesbian Employees at Microsoft, Native Americans at Microsoft and Hispanic Employees at Microsoft, sponsor a variety of activities—company events, mentoring programs and scholarship funds," she adds. "Our Diversity Advisory Council is made up of one employee from each group. It offers input on corporate policies and practices that affect diversity, employee benefits and product features. And for the company, employees involved in Diversity Advisory Council groups are also a great referral resource for other diverse candidates."

Avon

"We apply the broadest definition possible of diversity," explains Harriet Edelman, Senior Vice President of Global Operations for Manhattan-based Avon. The 35,000-plus corporate employees work at a company where the term diversity is constantly evolving. It can mean recognizing and valuing leadership styles (the company has a noticeable percentage of senior associates), or working successfully with the 3 million sales representatives around the world.

Avon is almost 100 years old, and respect for the individual, ethical behavior and giving back to the community have always been part of the corporate culture. So 20 years ago when Avon began fashioning an explicit corporate policy on diversity, there was an existing heritage on which to build.

Edelman's job includes the areas of manufacturing, distribution sourcing, customer service and IT. She frequently interviews for leadership positions, including senior directors, officers and staff consultants. "For IT in particular," Edelman says, "our staff is increasingly diverse."

There are entry-level opportunities in IT, as well as openings in the areas of third-party systems, enterprise systems and Web-enabled applications. Once somewhat isolated, IT is now a true business partner at Avon.

"We are very customer focused, meaning our internal customers and direct sales force," notes Edelman, "and we communicate clearly how IT fits into the overall structure, joined closely with business strategy at all times. To eliminate personal technology gaps, we offer internal classes, and encourage external classes through tuition reimbursement."

Avon wants employees to succeed and be rewarded for their work. "Retention and motivation are priorities," continues Edelman, "and a unique blend of elements combine to that end—we offer a high-energy environment, a fun environment and respect for IT in the larger organization."

Deloitte & Touche Consulting

"Deloitte is really trying to be color-blind," says Tanya Dance, West Coast-based Senior Manager with Deloitte's ICS consulting division. "Your career here is based on your ability."

All senior managers interview and have responsibility for hiring; internal referrals often provide the best people. IT at Deloitte is also receptive to all levels of experience, from summer interns who accept full-time jobs, to those from the country's top grad schools.

Dance is involved with SAP implementation. "For SAP, for enterprise resource planning software, I want experienced hires," she explains, "but there are paths for trainees. There's a six week training period just for SAP. In addition, these trainees work for six months on a

project under senior people. Their hours are not billable, but the client benefits from their work, and the trainee learns from the project." There is continual training in Dance's SAP area. Employees are also assigned a mentor, often a peer of the same level, as a coach and resource.

"We live in a global community and compete in a global market."

—LaVonne Dorsey, Microsoft

Retention brought the issue of diversity to Deloitte's upper management. "Some years ago, management realized women were being hired, but women were not being retained," notes Dance. "The Women's Initiative was the result, and now Deloitte is a top-ranked company for women."

The Diversity Initiative piggybacked onto the Women's Initiative, encouraging the recognition of cultural differences, issues of age and sexual preference. Volunteers and representatives from the company are the people behind the Diversity Initiative—Dance is the official West Coast representative for the ICS division.

At Deloitte, diversity came to be seen as more than not perpetuating stereotypes and not making assumptions—diversity became good business sense. "The client wants to see a diverse team," says Dance, "and since what we do is project-based work, a diverse team just naturally encourages thinking outside the box."

These efforts are noticed—Deloitte has moved up in *Fortune's* list of the 100 best companies to work for, from number 14 to number eight. Dance describes the other Big 6 firms as "cookie-cutter" environments, and Deloitte as a company that values entrepreneurial attitudes.

"What diversity means to me," Dance concludes, "is that Deloitte lets me enjoy my job—and I can still be me."



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PRODUCT REVIEWS

► Workgroup server appliance

Cobalt Qube 2 ties it all together

By Kevin Ralsback

SETTING UP a server is something only the IT department can do, and you need a bachelor's degree in computer science to build an intranet. Is that the view at your company? With the newest advances in server appliances, this couldn't be further from the truth. These user-friendly, Linux-based servers offer the best of both worlds: ease of use and high-quality open-source software.

Cobalt Networks has just announced the Qube 2, the successor to the Qube 2700WG. This tiny blue box comes ready to roll as an intranet workgroup server. It includes a Web server (Apache 1.3), e-mail services (Sendmail 8.8.8), HTML authoring tools, cross-platform file sharing (Windows Server Message Block and AppleShare), document indexing, and even private discussion groups.

The Qube 2, with its workgroup functionality, is just one of several server appliances. On the low end is the Corel NetWinder WS, a Linux-based Web server appliance. On the high end are products, such as the Network Appliance F700 Web server. Keep an eye out for a Test Center Analysis covering these

three tiers of server appliances in *InfoWorld's* May 10 issue.

The greatest thing about the Qube 2 is that everything can be configured from a Web browser. Its administration menus are designed with the novice user in mind. There is help available for every option, and the default settings don't need to be changed for most uses. Even OS upgrades can be easily done from your Web browser.

The Qube 2 comes with a 250-MHz 64-bit RISC processor, 16MB of RAM, and a 3.2GB hard drive. There are also models with as much as 64MB of RAM and a 10.2GB hard drive. The Qube 2 runs Linux 2.0 (kernel 2.0.34), and includes Adaptec SCSI drivers, so adding storage space is a breeze.

For network access, the Qube 2 can either be plugged in to an existing router, or it can serve as an Internet gateway complete with a serial port—for dial-up Point to Point Protocol—or dual 10/100Mbps Ethernet ports. The Qube 2 can also be configured to act as a domain name server and Dynamic Host Configuration Protocol (DHCP) server.

Changes from the original Qube 2700WG include a faster processor,



COBALT NETWORKS has expanded the speed and functionality of its Qube 2 server appliance, which spans just 7.25 inches per side.

larger hard drives, and a built-in packet filter. Also, the Web server has been updated from Apache 1.2 to Apache 1.3, and includes Microsoft FrontPage extension support. E-mail services have been improved by supporting filtering and e-mail aliases, as well as adding a scheduled delivery option.

I plugged a Qube 2 into a standard workgroup hub. When I first powered on the box, the LCD screen on the back kept me informed as it went through the start-up procedures. It scanned the hard

drive, then checked the network for a DHCP server, and set up the IP address. The LCD screen displayed the IP address, so I could connect with my browser. If you do not have a DHCP server on your network, you enter the IP address for the Qube 2 through a set of buttons on the back of the unit.

I pointed a Web browser to the IP address of the Qube 2 and went through the step-by-step configuration screens. I proceeded through seven screens to configure the Qube 2: network configuration, administrator account setup, services, timer/date, access rights, user account setup, and group setup. After completing these steps, the Qube 2 was ready for use.

I tested the raw HTTP and FTP throughput of the Qube 2 against a similarly configured PC running Red Hat Linux 5.2, and found the Qube 2 to perform comparably, even during a large download. Of course, with its dual 10/100Mbps Ethernet ports the Qube 2 should have no problem keeping up with network requests.

Overall, I was impressed with the Qube 2. It is a fine example of how Linux and other open-source tools can be used in a business environ-

THE BOTTOM LINE

Qube 2

This intranet workgroup server appliance offers a wealth of functionality in one easy-to-configure package. Its applications include a Web server, e-mail, file sharing, and discussion groups. It has been designed for even the most non-technical of users.

- **Pros:** Inexpensive, easy to set up, easy to administer, looks cool on your desk.
- **Cons:** No built-in group calendar system.
- **Cobalt Networks Inc.,** Mountain View, Calif.; (650) 930-2500; www.cobaltnet.com.
- **Price:** \$999 for Qube with 16MB of RAM and a 3.2GB disk drive; \$1,499 for 32MB of RAM and a 7.6GB disk drive; \$1,799 for 64MB of RAM and a 10.2GB disk drive.
- **Platforms:** Runs Linux 2.0; supports Windows, Macintosh, Unix, etc.

ment. And it is just what many workgroups and small and remote offices need: a powerful server that is easy enough for nontechnical users to set up.

Kevin Ralsback is a technology analyst at the InfoWorld Test Center. He can be reached via e-mail at kevin_ralsback@infoworld.com.

► Windows office suite

Corel adds voice, Microsoft compatibility to its suite

By Patrick Marshall

WITH THE beta release of WordPerfect Office 2000, Corel makes it clear that it does not expect to supplant office suite heavyweights Microsoft Office and Lotus SmartSuite. Instead, the next version of Corel's office suite represents what may be a last-ditch effort to hang on to an already very small slice of the office suite market.

Indeed, one of the most highly touted features in this beta release of WordPerfect Office 2000 is enhanced compatibility with those competing products. While continuing to employ a native file format identical to that used in WordPerfect 6, Office 2000 introduces enhanced file conversion to make it easier to convert documents among WordPerfect, Word,

and WordPro. This enhanced conversion works in a similar way to Extensible Markup Language (XML), which uses meta data that travels with the file. Thus, when the file is reconverted to the word processor format, all of the data is restored.

Unfortunately, WordPerfect Office 2000 will be a step behind the developments in Microsoft Office 2000, because it will not be able to handle Microsoft's HTML/XML format.

Corel has also tipped its hat to Microsoft by adding support for Visual Basic for Applications, in addition to offering its own PerfectScript. PerfectScript will make it easier for developers to quickly create custom applications with the tools provided in the suite.

WordPerfect Office 2000 does

WordPerfect Office 2000 applications

- Corel Central 9 contact manager
- Corel Presentations 9
- Paradox 9 database
- Quattro Pro 9 spreadsheet
- Trilix 2.0 Web page builder
- WordPerfect 9 word processor

push the envelope further than Microsoft Office in at least one respect: voice recognition. The suite will offer the tried-and-true Dragon NaturallySpeaking, a trainable product that allows users to dictate as many as 160 or more words per minute. And it's not just for dictation. You can also use Dragon to issue a limited set of voice commands for those formatting chores as setting text as bold or italic. Unfortunately, this feature wasn't functioning in the beta version I tested.

Another notable addition is Trilix 2.0, a very slick application for converting and formatting Web pages. Trilix does a better job of making it easy to generate attractive pages complete with navigation links and site maps than any other Web page designer I've seen. The product is integrated with the suite to the extent that you can choose to File/Publish to Trilix from WordPerfect. A dialog box will appear asking if you want to publish to a single or multiple Trilix page, and whether to maintain formatting or convert to a Trilix stylesheet. This integration is not, by the way, available in the suite's other applications.

Though Corel has not specified how many beta cycles it plans to go through, this seems to be relatively unsettled code. A lot of features are not yet implemented. As I mentioned, voice recognition is not available, nor is the full set of file-conversion capabilities. And the address book in CorelCentral isn't working either.

Still, users of WordPerfect Office 2000 can look forward to many sig-

THE BOTTOM LINE

WordPerfect Office 2000, beta

Corel has improved the strong suite of applications in WordPerfect Office 2000. Nonetheless, its major selling point is the third in a three-product market is the suite's expected low price.

- **Pros:** Supports Microsoft and Lotus file formats; voice recognition; first-class Web page builder.
- **Cons:** Contact manager not integrated with e-mail; Web designer integrated only with WordPerfect.

- **Corel Corp.,** Ottawa, Ontario; (613) 728-8200; fax (613) 728-9790; www.corel.com.
- **Price:** Not yet announced.
- **Platforms:** Windows 95, Windows 98, Windows NT 4.0.
- **Ship date:** May.

nificant improvements in each of the suite's major applications.

WordPerfect 9, for example, now offers real-time previews. XLM

► **WORDPERFECT** page 86

WordPerfect

Continued from page 85

support, and font embedding, which means users will be able to view documents just as you formatted them—even if they don't have the appropriate fonts installed. There's also a nifty new autoscroll tool. Click on the tool icon, then simply move your mouse in whatever direction you want to go. This feature is comparable to IntelliMouse support, which is available in other applications in the suite.

Quattro Pro has taken on heavy-weight dimensions in this new version. The program can now handle as many as 1 million rows and more than 18,000 columns of data. And among the other formatting enhancements, Quattro Pro sports the new real-time preview feature.

WordPerfect Office 2000 also includes a completely redesigned

CorelCentral. This contact manager is not as well-designed as Microsoft's Outlook, and it doesn't integrate e-mail capabilities, but it does

is running.

Paradox 9 has also been significantly enhanced with a new Visual Database Designer and dozens of lesser new features, such as IntelliMouse support and the capability to handle .rtf and .jpg files.

Although the applications in WordPerfect Office 2000 are certainly powerful and relatively easy to use, they do not challenge the dominance of the applications in Microsoft Office. If users are going to be tempted to switch or to stay with WordPerfect Office 2000, it may be due to one feature: low price. Although pricing has not been set, expect WordPerfect Office 2000 to come in at less than half the cost of Microsoft Office.

Patrick Marshall is senior technology analyst at Federal Computer Week's test center and an InfoWorld contributing editor. He can be reached at pgmarshall@uswest.net.



THE SLICKEST ADDITION to WordPerfect Office 2000 is Trellix, a first-rate Web page designer.

offer a strong set of calendaring, task management, and phonebook tools. In fact, this version of CorelCentral has taken on some project-planning capabilities. You can now record your progress on tasks, and you can create subtasks for tasks. Also new is an alarm application that will sound for specified events regardless of whether CorelCentral

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Rex Pro PC Card Organizer

THE PALMPLOT AND palm-size PCs are capable devices, but even with their small size, they don't fit well in shirt or jacket pockets.

Even trimmer is Franklin's Rex Pro. First released in 1997, the Rex is a credit card-size device with a small but legible screen and a few control buttons. It offers a fairly complete calendar, address book, and to-do list, along with a simple clock and a memo file.

The latest version, Rex Pro, adds rudimentary data-entry capabilities. You synchronize Rex's data with your PC's personal information manager (PIM) by inserting Rex into a PC Card slot or by using an included cradle that connects to your computer's serial port. Synchronization takes only a few seconds, and eliminates

the need to rekey your data.

To add or modify contacts, appointments, and other information on Rex Pro, you use its arrow buttons to select letters one at a time. This is a laborious process, but it can come in handy.

Rex Pro is compatible with Windows 95, Windows 98, and Windows NT PCs. It comes with a basic desktop PIM, and can synchronize its data with Microsoft Outlook 97, Outlook 98, and Schedule+; Symantec Act 3.0 and 4.0; Lotus Organizer 97 and 97GS; and Starfish Software Sidekick 98.

What it lacks in power and flexibility, Rex more than makes up for in portability. If all you need is a simple way to carry along your calendar and contacts, Rex is it.

■ Franklin Electronic Publishers Inc., Burlington, N.J.; (888) 739-6400 (toll-free), (609) 386-2500; www.franklin.com; \$230.

—Dylan Tweney

//the-net//

► Embeddable database management system

Pervasive.SQL simplifies development

By Tim Fielden

WITH THE SHORTAGE and cost of IT folks these days, more and more developers and owners of small to midsize businesses are turning their attention toward building embeddable databases into applications, rather than managing two separate efforts—the application and the data.

Fortunately, companies such as Pervasive Software and its product, Pervasive.SQL SDK, Version 7, are making it easier to build applications that address the management issue. With a long list of helpful features, an inexpensive entry cost, and the capability to create applications that manipulate data with a significant reduction in management overhead, Pervasive.SQL is worth looking into.

Given the scope of the small to

midsize business market, it is understandable that Pervasive would join a large number of competitors, including Oracle, Sybase, and IBM among the top tier, and Empress among the second tier.

In my limited testing, Pervasive.SQL appeared fast, reliable, and inexpensive. It also includes a choice of database access methods, a small footprint, and "maintenance-free" operations, which means the product can be developed, deployed, and maintained with little or no assistance. It is likely to appear in offices with no database administrator.

Pervasive.SQL's scalability allows you to take a small application for one or two users and, with very few changes, put it on your intranet, for example, where hundreds of users could access it.

One of the many nice features I found was that you were not tied to

a specific programming language to learn the product. Pervasive provided its sample application not only in Java, but also in Visual Basic, C++, and Delphi, to jump-start either experienced Btrieve developers or those new to the tool.

Pervasive.SQL is a step up for those who currently use the Btrieve application development suite. Btrieve customers will gain because of Pervasive's capability to treat Btrieve data access in a relational manner.

For those users new to the software development kit, you will find that the package comes complete with a single-user SQL engine, a high-performance 32-bit ODBC driver, and a host of utilities to aid in the design, development, and deployment of your applications.

Regardless of how you discovered the tool, you will like many of

its features. I found the Data Dictionary File Ease utility a boon for those who want to create, modify, and monitor database and table definitions and statistics.

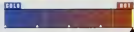
In development support, Pervasive includes an ActiveX interface complete with bound controls for list and combo boxes, to name a few. The data-source control can automatically interface with third-party data-aware controls such as APEX's True DBGrid Pro.

I found the Java APIs very useable and useful, as they followed a Java Database Connectivity-type approach for accessing data. I easily created a form that performed basic maintenance functions against a relational database file.

Should I decide that I need to make my video inventory accessible via my network or the Internet, for example, Pervasive has provided a tool to assist with that. Using the Inet Data Server, Pervasive made it easy to move my existing client/server software onto the Net.

If you are looking for an easy-to-use, low-cost, and low-maintenance embeddable database solution, take a look at Pervasive Soft-

THE BOTTOM LINE



Pervasive.SQL SDK, Version 7

Pervasive Software's latest release proves that a database management system doesn't need to be large or expensive to handle many applications. Excellent relational capabilities blend with fast transaction-processing power and reduced administration requirements.

► **Pros:** Inexpensive solution; excellent documentation; easy to use; scalable.

► **Cons:** None found.

► **Pervasive Software Inc.**, Austin, Texas; (800) 287-4383, (512) 231-6000; www.pervasive.com.

► **Price:** \$295

► **Platforms:** Servers: Windows NT 3.51 and 4.x, NetWare 3.12 and 4.x. Clients: Windows 95, Windows NT 4.x, Windows 3.x, OS/2 3.0 and 4.0, DOS 5.x and 6.x.

ware's Pervasive.SQL SDK.

Tim Fielden is a free-lance writer in St. Paul, Minn. Send him e-mail at tfielden@uswest.net.

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► Year-2000 desktop assessment tool

OnMark 2000 held back by faulty database reporting

By Eric Hammond

PREPARING your systems to avoid year-2000 bugs is so important that you require nothing less than perfect tools. Yet the pressure to beat the deadline has forced some developers to rush their products to market.

Viasoft's OnMark 2000 Assess, Version 3.0, appears to be an example of software produced under this pressure. The heart of the tool, OnMark 2000 Assess, offers a technologically advanced year-2000 analysis tool, with some very nifty capabilities for analyzing spreadsheets. The problems, however, start on the Server Edition side of the tool, where poor documentation, clumsy configuration, and ODBC bugs combine to render the product virtually unusable as shipped.

Let's start with OnMark 2000 Assess's strengths, all of which are present in the \$49 version that you can buy from Viasoft's Web site. OnMark 2000 Assess quickly analyzes a PC's hardware, its operating system, installed applications, and user data. The resulting log files contain thorough information about year-2000 issues on a particular PC.

The System Date Test checks BIOS issues and looks at how the OS is set up to display date information.

Simply changing Windows' date format to include four-digit years can clarify date ambiguities in Microsoft Excel, for example.

OnMark 2000 Assess' Application Scan looks at third-party applications installed on the PC and flags date issues. OnMark 2000 Assess flagged my outdated version of Internet Explorer; informed me that SQL Server 6.5 would need Service Pack 5 to fix some critical year-2000 issues; and provided detailed information about the date headaches associated with Excel and Access.

The Data File Scan is where OnMark 2000 Assess really shines. It inventories user data files on a PC and pays special attention to database and spreadsheet files, places where year-2000 bugs are most likely to bite. The Data File Scan is highly configurable and finds many types of problems in spreadsheets. Additionally, it will create an annotated version of an Excel spreadsheet with color-coded cells, ranked according to severity, and includes comments describing the year-2000 problem found in a particular cell.

The Data File Scan logs will also link to OnMark 2000 Workbench products for Access and Excel files.

Until this point, OnMark 2000 Assess was great, but here is where



ONMARK 2000 ASSESS' interface and log tools make it easy to test individual PCs.

my infatuation ended. I tried to configure the database connectivity feature to provide centralized reporting on year-2000 issues on PCs. I checked out the database functionality for SQL Server. (Access is also supported, and Oracle is in the works.)

In the documentation, Viasoft could not seem to get its story straight about naming the database elements—including the device, database, and ODBC data source name. I had to go into the ODBC error log to figure out what source name OnMark 2000 Assess was trying to connect to.

Once I made the connection, I

tried to import the log file into the database and got a generic ODBC driver error. Viasoft suggested this was due to changes Microsoft had made to the ODBC driver. I downgraded my SQL Server ODBC driver and was then able to proceed.

Once a database is successfully built, the database tool offers centralized reporting on PC year-2000 compliance information. I was disappointed to find that the database reports on only data file status, not on the status of the system and application analysis. It seems this step wouldn't be that hard to take and would add to the value of the database tool.

Furthermore, the database tool is really only for gauging the progress of the year-2000 fix. It doesn't include the links found in the log files when viewed on an individual PC, and it doesn't allow the user to drill down to the individual file level.

OnMark 2000 Assess is a great tool for analyzing PC year-2000 readiness, but the centralized reporting features that enterprise users need are a real pain to implement and offer limited value once

THE BOTTOM LINE



Viasoft OnMark 2000 Assess, Version 3.0

Viasoft OnMark 2000 Assess provides an excellent tool for analyzing year-2000 compliance on a single PC, but the Server Edition falters when centrally reporting results through a database.

- **Pros:** Speedy, thorough assessment of PC hardware, OS, application software, and user data; very nice analysis of year-2000 issues in Excel files.
- **Cons:** Clumsy configuration of centralized reporting in the Server Edition, riddled with documentation and operations errors.

- **Viasoft Corp.,** Phoenix; (888) 842-7638 (toll-free); www.viasoft.com.
- **Price:** Assess Server Edition: \$7,500 for 100 users; Standard Edition: \$49 via the Web.
- **Platforms:** Clients: 16- and 32-bit Windows on Intel PCs; Server Edition requires Microsoft SQL Server or Microsoft Access.

they are in place. I recommend you save yourself \$25 per copy and get the \$49 version of Assess without the database connectivity.

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ON THE EDGE • JEFF SYMOENS

Microsoft Exchange Server performance tools and the last word on the shutdown bug

LAST NOVEMBER, I wrote a pair of columns discussing some troubles associated with shutting down Microsoft's Exchange Server. I've finally gotten to the bottom of the issue, and now I'll give you the final word on solving the shutdown problem. But before I do that, first let me bend your ear on Exchange Server's performance, because there are some great tools to help you analyze your Exchange environment.

Many times at the InfoWorld Test Center we have measured a product's performance relative to other products in a given category. However, even if you aren't doing comparative testing, measuring performance can be the key to helping you determine capacity-planning requirements or isolating bottlenecks on a given platform. So let's get started

measuring the performance of Microsoft's Exchange Server.

If you're a die-hard Exchange administrator, then you are probably already aware of a few Microsoft tools that will help you pound on Exchange Server and see how well it performs. If you're not, then you'll definitely want to keep reading.

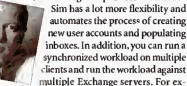
There are two key tools available from Microsoft that generate a good load on Exchange Server. The first is MailStorm, which is available on the Exchange Server resource kit CD. You can also download it from Microsoft's Web site at backoffice.microsoft.com/download/moreinfo/exchresource.asp.

The gist of MailStorm is that it allows you to send groups of e-mail messages to Exchange recipients. Each message group can contain a number of messages and be sent to several recipients, so you can start to produce a fair load on the server. This tool has a good number of options, and it is pretty handy for basic connectivity testing or lightly loading the server. If you like, you can also simultaneously run the tool from several workstations to increase the load. MailStorm has some limitations, however; it really only sends messages, and even if you run the program on several clients,

it won't give you a real synchronized workload, which is important for repeatability.

When you need a step-up from MailStorm to start generating greater, more realistic workloads, you can check out Microsoft's Load Simulator (or LoadSim), which is available at backoffice.microsoft.com/download/moreinfo/loadsimulator.asp.

LoadSim provides a much more robust workload than MailStorm, as LoadSim can simulate the work of thousands of users sending and receiving messages, replying to mail, or working with public folders. LoadSim has a lot more flexibility and automates the process of creating new user accounts and populating inboxes. In addition, you can run a synchronized workload on multiple clients and run the workload against multiple Exchange servers. For example, you might want to run the program on 20 clients, emulating 100 users per client, in order to simulate 2,000 users. And you could run the workload against two or more Exchange Servers.



Shutdown revisited

Now, let's get back to that Exchange shutdown problem. The problem was that after installing Microsoft Exchange Server, shutting

down the program took about 15 minutes, an increase from the normal range of 20 seconds to a couple of minutes. I suggested fixing this with a batch file that manually stops the Exchange-related services prior to shutdown.

A few readers suggested the problem was really with Windows NT and not with Exchange. This was confirmed by a support engineer in the BackOffice group of Microsoft's Premier Support Services. As the engineer explained, the problem is that `services.exe` hangs during the shutdown process. A replacement file for `services.exe` is available in Windows NT Service Pack 4 (SP4), which is why some of you noticed that the application of SP4 fixed the problem.

In addition, a couple of readers noticed similar shutdown problems with Computer Associates' Arcserve. The issue with Arcserve is different, but the fix is the same—apply SP4.

How do you measure server performance? Send me an e-mail outlining the details of how performance testing fits into your deployment plans.

Senior Analyst Jeff Symoens lives on the edge at the InfoWorld Test Center, where he covers enterprise platform products. You can ping him at jeff_symoens@infoworld.com.

THE GRIPE LINE • ED FOSTER

Holiday shopping on the Net: Many are grumbling about I-commerce bugs

YOU HAVE NO DOUBT heard some of the glowing reports about the incredible amount of shopping that was done via the Internet over the holidays.

But, Scrooge that I am, I have to tell you that not all was joy and light this Web-based Christmas, and some of those holiday shoppers are saying "bah, humbug" right now about the promise of Internet commerce.

Christmas complaints on the Gripe Line ranged from online vendors making deceptive claims on their Web sites to shipments that didn't arrive by Dec. 25. Even in those transactions that went relatively smoothly, delays in receiving the merchandise were quite common. Mishippments, price mix-ups, and disappointments over product quality — although perhaps no more prevalent than might be found among shoppers using other forms of direct purchasing — left many time Internet shoppers with a bad impression and even discouraged some veterans.

Small problems were often made bigger by the fact that most Web retailers aren't really set up to provide much in the way of customer service when the automated systems fail. One frustrated reader kept running into sites that failed to tell him a sales tax would be added to his order, and then found it next to impossible to cancel his orders when he objected.

"I do not mind paying appropriate sales tax, but when I go to a store, they show me all the charges before I pay for the product," the reader says. "If I walk out of the store and decide to return the product, there is a simple process to make that happen. E-commerce sites have to do figure this out."

Faced with a host of online retailers no one had heard of a year ago, many buyers just don't know which operations are legitimate.

In early December, one reader ordered a video from an obscure Web retailer. Well into January he still has not had any response to his phone calls, e-mail, or faxes from the company telling him where the product is.

"The only good thing is that no charge has appeared on my bill so far," the reader says. "I have received no response at all. This is the kind of thing that will kill e-commerce, because these experiences will prevent anyone from trusting any Internet store."

The specific complaint I heard the most frequently, however, involved a familiar name. Or two familiar names, actually, although the second is one that I never thought I would write about here. A number of readers reported using Egghead's site to order what apparently was a very popular gift this

year, the Barbie Photo CD.

"The item was listed as in stock and, in fact, remained so listed on its site weeks later," a reader relates.

One week after ordering the product, the reader called Egghead customer service to find out where it was.

"The customer representative told me that the product was not in stock and would not be for several weeks," despite the product being listed as in stock on its Web site," the reader continues. "When I requested her manager, she informed me that 'he doesn't talk to customers.'"

At least that reader discovered the truth on

his first phone call; others weren't so lucky in their quest for the Barbie Photo CD from Egghead. Another reader was forced to endure hold times of 1 hour or more on several calls where he was assured several times the product was on its way. He was even given an invalid tracking number to play with briefly, before finally being informed that the CD was not in stock.

"I cannot believe how terrible Egghead's systems are that they can't tell the status of an order or provide online customer service," the reader wrote. "If Egghead's new strategy is to be a completely 'virtual' store, they have significant improvements to make to its customer service or it should just give up."

Egghead is not planning to give up, says a company spokesman, but it acknowledges that its site is not all it needs to be.

"The issue with the Barbie Photo CD product was one of having a commitment from a vendor for a substantial number of units and not having that commitment fulfilled," says

John Hough, Egghead corporate communications director, in Vancouver, Wash. "We are profoundly unhappy that this situation occurred, because certainly we know customers look to us and not to some nameless vendor."

Hough says the Egghead site is still a work in progress, and the company is focused on implementing an automated tracking system for customers.

"This is one of our biggest investments in the coming months, so hopefully next year we'll be an example rather than a problem," Hough says.

I certainly hope that will be the case next year. Call me a Grinch if you will, but I really don't want to write too much more about Barbie.

Ed Foster has been writing about technology and consumer issues for nearly 20 years.

Send him gripes about computer companies and products at gripe@infoworld.com, or visit his forum at www.infoworld.com.



NOTES FROM THE FIELD • BY ROBERT X. CRINGELY

Bobby and Rose give two thumbs-down to a recent movie-going experience

ROSE AND I WENT TO SEE THE movie *You've Got Mail* last week. What a lame waste of money that was. If you

ask me, there hasn't been a decent movie since *Pulp Fiction* (but then I always did have a thing for Uma Thurman — I even liked her in *The Avengers*).

Stop bugging me

With the Golden Globes and the Oscars coming up, I wish the guys who decide which movies should win would take a leaf out of *BugNet*'s book. The company — which discovers and provides fixes for PC bugs — has decided to abandon its annual award this year. The award goes to the vendor that has the best bug-fix performance in the industry, but in the words of *BugNet*, "the PC software industry's performance has been abysmal." Hence, no award. A page on *BugNet*'s Web site (www.bugnet.com/analysis/no_award.html) catalogs hor-

ror stories of users who have discovered problems and have been ignored by the vendor concerned.

I was sent one example of this kind of behavior myself this week: A reader, who had bought an 8MB AGP video adapter with his Pentium II, was trying to use Symantec's new WinFax V9.0, but found that every time he used the Scan and Send feature, his machine crashed. And the solution proposed by Symantec's technical support? Set the video driver back to standard VGA, or scan the document using another application. Thanks, guys — that's really helpful.

Europeans go remote

Following last week's tip that Ericsson is prowling for start-ups to buy, I hear that fellow European Nokia, too, is on the hunt. Only trouble is, both companies are targeting remote-access vendors so we may see a bit of competition there. I guess Ascend's

price tag was just too high.

Speaking of Europe, I'm told that Dell Europe is expected to give a boost to the XML community by adopting the Exelon data server from Object Design to bring some order to Dell's somewhat chaotic electronic-commerce infrastructure in Europe.

Eyes down

I like the Jargon Bingo game being hosted by Lotus411 at this week's Lotusphere conference. Adapted from a game developed at MIT for an AI Gopher speech, it involves contestants selecting the first three words of jargon they expect to hear during a keynote, with a \$100 prize for whoever is right.

My only suggestion is that they should take it one step further: To encourage keynoters not to abuse the English language as they normally do, I think a mild electric shock should be administered to the speaker for every jargon word mentioned.

YOU KNOW, I'M BEGINNING to think that maybe *BugNet* should rethink its whole approach to awards. Sure, people want to know which companies have the best record of fixing bugs — but they also want to know about the companies with the worst records.

Better still, let's apply that to the Oscars, and have awards for Worst Movie, Worst Actor, etc. Now that would make the ceremony worth watching.

Award me a tip. You can call me at (650) 312-0555, fax me at (650) 286-2775, or e-mail me at cringe@infoworld.com.



DOWN TO THE WIRE • NICHOLAS PETRELEY

As Linux begins to chart new territory, Intel has much to gain — and lose

LAST WEEK I TEASED you with the suggestion that Linux could prove to be both boon and bane to Intel. The primary reason Intel needs Linux is Windows. Intel keeps making computers faster, more scalable, and more affordable. As Intel computing power has increased, the price of Intel chips has decreased. That makes Intel-based computers increasingly competitive with higher-priced RISC boxes.

The problem for Intel is Microsoft keeps making Windows faster, slower, bugger, and more expensive. That means Windows-based computing is less competitive with higher-priced RISC architectures than it should be. Enter Linux. Linux offers the speed, stability, and scalability that is lacking in Windows NT. It has a remarkable level of compatibility. (It offers NT file and print services, Novell Directory Services, etc.) And it does all of this at a rock-bottom price.

That's why Intel loves Linux. Linux does a better job than Windows at elevating Intel computing into a more competitive position

with higher-priced RISC workstations. The problem for Intel is that Linux also runs on these alternative RISC systems and more. It runs on Sparc, the Alpha, StrongARM, Macintosh — heck, it even runs on a PalmPilot. Any vote for Linux promotes an OS that is essentially platform agnostic.

That doesn't automatically constitute a threat to Intel, though. Whether or not Linux eventually spells trouble for Intel depends on a phenomenon I will call "the threshold of fear." The threshold of fear is the dividing line between two kinds of IT customers — those who find the best solution for a business problem, and those who redefine the business problem to fit their most familiar frame of reference.

The most familiar frame of reference for

IT departments that grew up on PC hardware is Intel. Anything outside Intel is located (along with other mysterious systems, such as Unix and MVS) on the uncharted part of the map that says "Here be dragons."

Those IT departments that grew out of a heterogeneous mixture of hardware and software platforms have a higher threshold of fear. Their map is much bigger, and they are less intimidated by uncertainty. If the best solution is an AS/400 and they don't have anyone on board with AS/400 expertise, they hire a cartographer.

By the way, it is this very same threshold of fear that explains why Windows NT never amounted to much on MIPS, Alpha, and the PowerPC. Customers who were familiar with alternative architectures to Intel had developed a high enough threshold of fear that they were not intimidated by the operating systems native to these platforms. To put it bluntly, most people who knew their way around established RISC systems knew enough not to run NT on them.

The threshold of fear leads me to speculate on at least two possible futures for Linux and Intel. Linux may simply invade the space below the threshold of fear. This is likely to happen if we see continued Windows 2000 delays, or if it ships and doesn't meet expect-

tations. In that case, Linux may replace Windows as the safe choice on Intel. I will call that the *Linux future*.

On the other hand, there is the remote possibility that continued success for Linux will raise the threshold of fear. In this future, Linux is successful, but fewer people are intimidated by non-Intel platforms than they were by non-Wintel platforms. If this is the way things turn out, Intel will need to come up with some compelling reasons why its architecture is preferable to the cleaner, more scalable RISC architectures.

The just rewards

It is my honor to award the InfoWorld Industry Achievement award each year. I need your help. I only have a couple of weeks to decide on the winner, and I haven't even narrowed the choice down to a good list of nominees. It isn't just a matter of who deserves the award: I'm having as much trouble deciding if there really is a single person or achievement that qualifies, or if the award should go to a group. And if so, how does one define the group?

I would appreciate your input on the matter. I invite you to e-mail me with suggestions for who should be rewarded for the greatest achievement in 1998 and why he or she deserves it more than the other potential nominees.

Send your comments to former consultant,

programmer, and dragon slayer
nicholas.petreley@infoworld.com,
and visit his forum at www.infoworld.com.



FROM THE ETHER • BOB METCALFE

The Internet in 1999: This will prove to be the year of the Bills, bills, and bills

IN 1999, it's the Bill, Bill, Bill, bills, bills, and more bills.

Of course, the sorry spectacle of how Bill Clinton is clinging to abused power is not something I can get into here.

Bill Gates is also clinging to abused power. I've been urging him to have an Antitrust Epiphany, just like his Internet Epiphany in 1995, but it's too late, which is too bad. (See "Survival lessons: Skunks, Microsoft, and Bill Gates' 1998 Antitrust Epiphany," www.infoworld.com/printlinks.)

We are moving from personal computing, where Gates has his monopolies, to network computing, where, thanks to our antitrust watchdogs, Gates will have to compete just like everybody else.

Chances are, 50 percent of U.S. households will have computers in 1999, and 33 percent will be online. Getting the other 67 percent online will require most of us to move in the coming years from Gates' PCs to somebody's

network computers.

Bill Kennard, chairman of the Federal Communications Commission, is working to get us the bandwidth we need to robustly connect our home computers to the Internet. And by "robustly" I certainly do not mean dial-up telephone modems.

Of the 50 million U.S. households with computers, 15 million already have more than one. So Kennard not only has to get serious bandwidth to homes — despite telephones — but also around homes using LANs over telephone wires, television wires, power wires, or no wires at all.

Next week I'll return to why Kennard should not accede to demands from telepolies and their dupes in the computer in-

dustry to speedily eliminate FCC regulation of the telepolies. (Hint: Without FCC regulation, we would be stuck with fewer, bigger telephone monopolies and their 51 public utilities commissions.)

Internet bills are being passed at accelerating rates by various legislatures — on taxation, censorship, privacy, etc. It's not going to work to simply oppose them all. We do need law and order on the Internet.

During 1999, the number of Internet users will surge 28 percent to 147 million. Two-thirds of the people who will be online by 2002 are not online today. Governments cannot ignore these numbers. And for the first time, most Internet users — 51 percent — will live outside the United States.

Because I've not received a Marxist death threat in a few weeks, let me repeat my call for a Pay-As-We-Go Internet (TM). (See "Companies start offering infrastructures for the Pay-As-We-Go Internet," www.infoworld.com/printlinks.) In 1999, we'll be paying more bills for the way we use Internet resources. I know this because I am an expert in all three major branches of economics: macro, micro, and home.

Bills of Amazonian proportions are being paid for an increasing number of things be-

ing bought over the Internet. During 1999, Internet commerce, which is growing 30 times faster than most world economies, will reach \$68 billion.

Between now and 2002, \$900 billion of purchases will be made via the Internet. Did I mention that the Internet can no longer be ignored by governments? Internet purchases will not long be exempt from taxes.

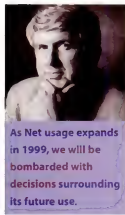
In 1998, the number of women on the Internet jumped from 43 percent to 48 percent. In 1999, women will become the majority of users on the Internet. This is important because recent studies show what I have suspected for a long time: Women are different from men. Women go to different places on the Web. They spend less time surfing. And they are the primary decision-makers in a majority of household purchases.

Now, if you expect to pay your Internet bills out of the proceeds of Internet stock gains, better sell now.

(If you want to see where I got all of my facts for these comments on 1999, see the data-based ruminations of Frank Gens, chief analyst at International Data Corp., at www.idc.com/FE/11231999.htm.)

So in 1999, it's Bill, Bill, Bill, bills, bills, and more bills. I'm so excited — just can't wait until 1900!

Internet pundit Bob Metcalfe invented Ethernet in 1973 and founded 3Com in 1979. Send e-mail to metcalfe@idg.net or visit www.idg.net/metcalfe.





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